The Commercial Car Journal

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Are the Present Service Station Methods Conducive to Sales?

Standard Policy Needed Which Will be Honored by the Whole Industry. Small Dealer Needs Assistance Most of All

By C. P. SHATTUCK*

A GROUP of men were playing cards in the club car of an extra fare train plying between Detroit and New York recently and so engrossed were they in their game—it was poker—that they did not realize it was midnight until one of the party pressed the button for the porter. "George," he said, when the porter came to attention, "Fetch me a nice toasted chicken sandwich with plenty of white meat and sprinkle some celery salt and a little pepper on it, and a cup of coffee," and turning to the others in the party said, "What will you have, boys? This is on me."

"Sorry, sah," said the porter, "but de dining car am closed."

"Oh, well, dig one up for me somewhere. You can do it, George. You know me?" and he winked expressively reaching at the same time into his pocket.

"I suah would like to accommodate you, sah, but de dining car am closed and has been for foh hours, sah."

"Well, dig us up some crackers and cheese, then. Anything so long as it's eats."

"Sorry, sah, but dere ain't a cracker to be had, not anything to eat. I could wrastle some eats myself. Yes, sah, I suah could."

"Well, of all the rotten service," exploded the seeker after food. "And they call this a first class train. Pretty punk service I call it," and he raved on.

Why Kickers Kick

After the game had broken up and the disgruntled party had sought his berth, one of the group remarked that Mr. X was some kicker. "He is that and then some," chimed in another, "but he is not alone. The trouble with him is that he never rode on other than a day coach. Why when he came aboard and the porter showed him his seat he asked where the car with the berths was. And in the lavatory he didn't know how to operate the drain of the wash basin," which remarks elicited chuckles from all except one who said:

"I don't think we should criticise Mr. X when he failed to obtain something to eat. He would not have put up such an exhibition of temper had he known that the dining car service was at an end. It may be true that he never rode on other than a day coach until now but let me ask you if this or any other railroad informs a purchaser of a ticket, directly or indirectly, what their service policies are? What the passenger may expect for his money? No, you must either ask questions or learn by experience and the public adopts the latter method as did Mr. X when he used the wash basin. It was but natural for Mr. X to assume that when he paid an extra fare to ride on this train that he was to receive extra service. Naturally he was peeved when he failed to obtain a snack to eat. Had Mr. X been informed what service he was entitled to when he bought his ticket, had the railroads a standard service policy, posted it in their trains, etc., or otherwise advised the public, we would hear less kicks of the character made by Mr. X."

* * *

Vague and Ambiguous Meaning

There are many of the Mr. X type among purchasers and users of motor trucks, men who have been led to believe or who like Mr. X anticipated some "extra service." It is not an uncommon type and the average dealer and factory heads are familiar with the class of owners who complain that the service obtained is a round peg in a square hole. The development of this class may be said to be largely due to the vague and ambiguous interpretation of service both by the dealer and the owner. And if we are to believe all we hear from those interested in the subject there are as many interpretations of the word service as foods marketed by the famous "57" variety manufacturer.

Need of Standard Policy

The writer does not propose to even attempt to define the word service, but he takes this opportunity to call attention to the need of the motor truck industry—the truck manufacturer, the parts maker, equipment manufacturer, distributor and dealer—solving the service problem, of at least making a coordinated effort to give the word service a real, business-like meaning. And after this is accomplished, and it will be no easy task if all angles of service are considered, the merchandising of motor highway transportation will be placed on that high plane it deserves and eventually will be.

A standard service policy—if one be possible, and there appears to be no reason why the truck industry cannot be as unanimous as to a service policy as it is to its warranty—will work miracles among certain classes of dealers provided, however, the manufacturer writes the service policy into the dealer's or distributor's contract and sees that it is enforced.

Small Dealer Handicapped

The need of some such policy is apparent when one considers the conditions existing among dealers. The small dealer says he cannot compete with the older and successful distributor in the same territory who can afford to "give" better service? Many small dealers having the earmarks of success complain that they cannot afford to maintain outside inspectors to watch the customer's truck, to give months of free inspection and adjustment, free oil and grease or to make replacement and repair bills "attractive" to the owner. And one of these dealers asks the very pertinent question, "why has the truck owner been taught to expect free service?" Also, "would a truck owner expect a jeweler to run after him (the truck owner) to see that the watch was wound just because he bought the watch?"

How Manufacturer Suffers

If some dealers overdo service, give away too much to the customer as the small dealer says they do, there are equally as many, if not more, who give poor service if they give any at all. This class will be found in what is termed isolated territory or small towns, and frequently is of the sub-dealer or sub-agent type. These dealers may sell one, perhaps five trucks the year but they say that the net profits will not permit of the investment necessary for the establishment of a real service station and the stocking of necessary parts, although many admit the value of service and its

* Editor's Note.—This is the first of a series of articles dealing with service problems by Mr. Shattuck. The second will appear in an early issue.

relation to future sales. Generally speaking this isolated dealer represents a distributor—but does he not also represent the factory? And—is the manufacturer of that truck that is not being properly serviced getting a square deal under such conditions?

Contention is made by the distributor, and others, that the owner should depend upon the nearest distributor or a representative having the facilities to give service and parts. While this plan may be logical in some places where the distribution plan provides for service by every representative, it is not always practical; in others because the owner will not drive a long distance, nor can he be reasonably expected to ship a truck because it is not capable of being propelled. It is the inability, or lack of service, that is being capitalized by the salesmen of the big dealers in the small dealer's territory and it has its influence on the prospect because he knows the small dealer's limitations and is impressed with the service talk of the representative of the distributor, "the dealer with over $50,000 worth of parts, traveling mechanics, etc."

Dealer or Representative?

There are hundreds, yes, thousands of new, young dealers including many of the isolated type just referred to, all striving to become big dealers, and the majority have limited capital. The writer spent many weeks this summer with a car calling on the isolated type as well as those with whom they are connected, and the majority said they hoped to be able to give the same service as did their brother dealers in the city. Many said that aside from a series of form letters from the distributor and an occasional call by one of his "office" representatives, they are left to solve the many problems incident to selling trucks and service.

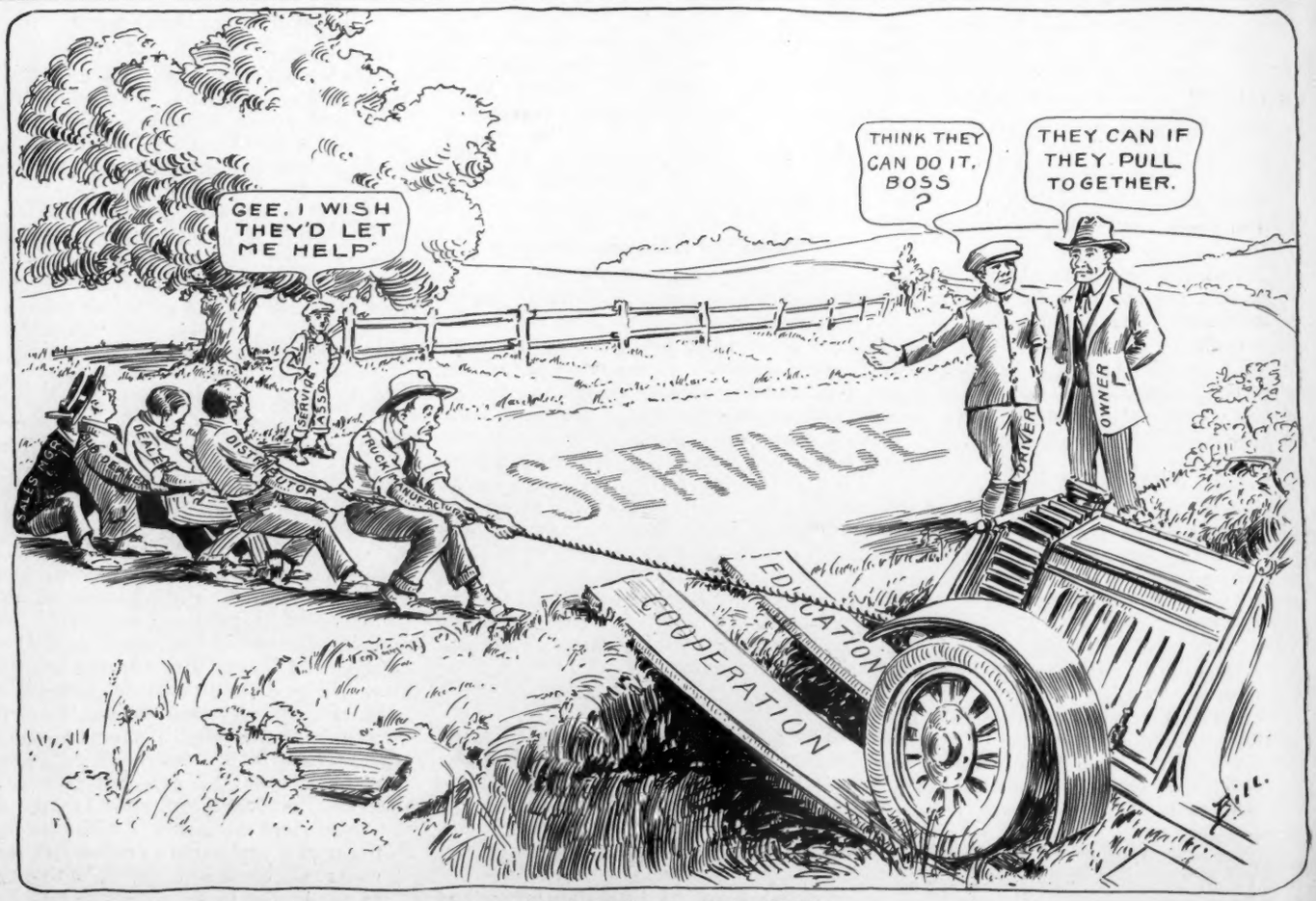
In a number of instances the writer found that these small or isolated dealers or sub-agents are the results of the policy of "placing a representative." In Vermont, New Hampshire and Maine, for example, the writer came in personal contact with this "representative" type. One was an undertaker in a town where there are good opportunities for merchandising trucks. Another place a truck was "represented" by a small fruit dealer, and in still another a railroad employee "sold" the truck. Explanation is made that it is difficult to obtain other than this type of "representative" and granting the truth of the statement insofar as it applies to sales, how can these "representatives" as well as the isolated type give service let alone successfully merchandise trucks without a guiding hand? Surely the mail correspondence course is not always successful. What should be done to aid the dealers of these types? How can he be financed so he may have at least sufficient parts to service the one, two or five trucks he may sell?

Who Will Service the Farmer?

Great stress is being laid on the potentiality of the farmer market. Educational tours have been made and are being planned to show the farmer what the truck can do. The interesting thought in connection with the farmer market is the probability that the small or isolated dealer may be the medium of distribution in agricultural districts. Who is to supply service to the farmer?

One could go on at great length pointing out the weak links in the present service chain but after much discussion the conclusion would be reached that service as now interpreted is not stable and that in many sections is not conducive to sales. If a standard service policy could be worked out, and as previously stated there is no reason why it cannot, the dealer will know exactly what to expect in support from the manufacturer and the owner in turn will know what he may expect from the dealer. And in threshing out the problem some plan may be evolved whereby the isolated dealer's burdens may be lightened.

A standard service policy coupled with an educational campaign ought to do much to stabilize service. It would at least have its effect upon the enthusiastic salesman who is frequently accused of "overselling" service to a prospect. If the service problem or problems are to be solved it will be by co-ordinated effort of the manufacturer, his service department, the distributor, dealer and last but not least, by the service station manager of the dealer and the mechanics. It will take a long pull, and a strong pull, and the manufacturer who has evolved a satisfactory service policy will need to pull as hard as the one who has not.



"A Long Pull and a Strong Pull"

Service Relations Between Accessory, Parts and Assembly Manufacturer; the Distributor, Dealer and Owner

Extracts of Paper Read by E. A. Haskins, Service Manager, Federal Motor Truck Company, Before Service Managers' Convention

AN immediate clarification of the subject under consideration is obtained if we change the first two words, service relations, to maintenance relations, and the much buffeted word, service, can be relieved of its mystery if given the common sense interpretation "Maintenance."

In the following discussion we may use the term dealer in a general sense, meaning the vehicle manufacturer's distributing organization. We will also make two general subdivisions; one, the furnishing of parts and the other, their installation (under which will come the general discussion of instruction).

If every seller of merchandise would only have vision enough to realize the value of proper maintenance this subject would need no discussion. Under existing conditions, however, the future sales value—good will if you please, resulting from legitimate business-like effort to keep equipment in operation has been subservient to the idea of production, immediate sales and immediate profit.

Some seem to have considered this maintenance problem a burden or necessary evil rather than one of the important divisions essential to the continued popularity and sale of their product.

Others have surrounded it with a veil of mystery, intimating that there is only one place to secure parts and only one way in which parts can be made to perform satisfactorily the function intended. This does not apply to parts other than those covered by the subject.

To get down to particulars, we like to think of maintenance as vital but still incidental to the real problem, that is, sale of finished product. We are not in business to sell parts but to keep equipment in operation. We are not vitally interested where the customer secures supplies necessary to maintain his vehicle as long as parts are up to the standard necessary to secure best results.

There are two ways of visualizing the inter-dependence of all parties under discussion. First: Consider each as a link in a chain, each one responsible to the link on either side; starting with the parts maker as the ring and through the vehicle maker, distributor, dealer to owner, we find owner—the man who pays all our bills—dependent for satisfaction upon the parts maker. Likewise, dealer, distributor and finally the vehicle maker is hampered or helped by the parts maker's maintenance facilities.

Let us not throw too much of the load upon the ring end of the chain. Let the vehicle manufacturer consider himself as wholesaler or jobber carrying a stock of suitable size to cover several months' requirements and endeavor to educate the distributor and dealer to appreciate that they are the retail organization and upon them rest the opportunity of carrying a stock sufficient to care for day to day demands so that the hook end of the chain will really assist in catching additional buyers.

Second: Consider a pyramid with parts maker at apex and owner at base. All our increase in business is based on owners' satisfaction. If parts maker's product or service is not up to standard the owner will spread his feeling of dissatisfaction so thoroughly as to ultimately hinder Mr. Parts Maker's sales, and he is, or should be, vitally interested in owner's satisfaction, even though he does not get into personal contact with the owner, as do the other interested parties.

Now for the price: Everything bears a price—even satisfactory service costs something. The question of discounts and list prices has caused much discussion. It is manifestly unfair for the parts maker to establish list prices and discounts so that the price to owner, if passed direct by him, is much different than when handled by vehicle manufacturer and his distributing organization. I say much different advisedly, for it has never been our policy to attempt to hold to parts maker's list if this provided a greater or less profit than considered legitimate. We have endeavored to make our Service and Parts Division sufficiently attractive so that after the dealer has been properly started by vehicle manufacturer he will have real financial reason for keeping it up. The real fundamental of maintenance is speed or promptness of repairs. What matters a few cents more or less compared to a vehicle tied up for several hours or days.

It would greatly simplify matters, therefore, if the parts maker would establish a discount sufficient to enable his list price to mean something only as a comparison. Let him protect the vehicle manufacturer regarding deliveries and not supply owners or dealers direct when he is not shipping same parts to the vehicle manufacturer, who may have orders for similar parts which have remained unfilled for some period.

If the parts manufacturer's product is of a very specialized nature demanding more care, knowledge or experience in its maintenance than can be expected of the vehicle manufacturer's dealer's force, let the parts manufacturer establish his own wide-spread repair system and work with the dealer in caring for such work. We can see no reason why the vehicle manufacturer should receive any remuneration in any fashion from such work which has been performed without his knowledge or assistance and without material in which he has his money invested.

The parts manufacturer should appreciate the necessity of keeping the vehicle manufacturer informed in advance of proposed changes in design, so that we all have an opportunity of preparing to care for these changes and not wait until such changes are in production.

As an ideal we, therefore, have the owner cared for by the dealer who has a reasonable stock of most active repair parts and dependent upon the distributor for replenishment of his stock and for parts seldom used, as well as expert mechanical assistance and instruction. The distributor in turn depends upon the vehicle manufacturer for his supply of parts so that his efforts can be roughly checked. Failure of any one of these should permit of the owner's request upon parts maker receiving prompt and immediate attention in such a way as other parties can be kept informed of their shortcomings so that proper action can be taken to prevent repetition.

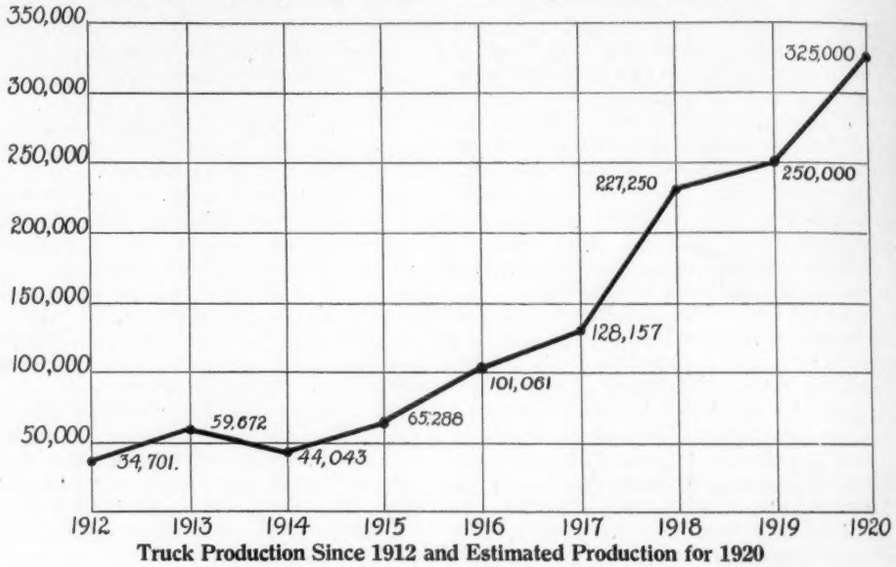
The price demanded by parts maker from owner should be sufficient to discourage such relations if dealer is honestly trying to maintain the owner's equipment. We believe that parts maker's price should be greater than the vehicle manufacturer's list so as to discourage direct dealing unless vehicle maker or dealer is not making honest effort in owner's behalf.

The furnishing of parts is given the position of importance due to its being by far the most important feature of satisfactory maintenance. Parts themselves, however, are of little value unless properly installed. Therefore, every vehicle manufacturer should be able to secure suitable instruction from the parts maker so that he in turn can properly instruct dealer's organization by means of shop courses, schools and printed instructions.

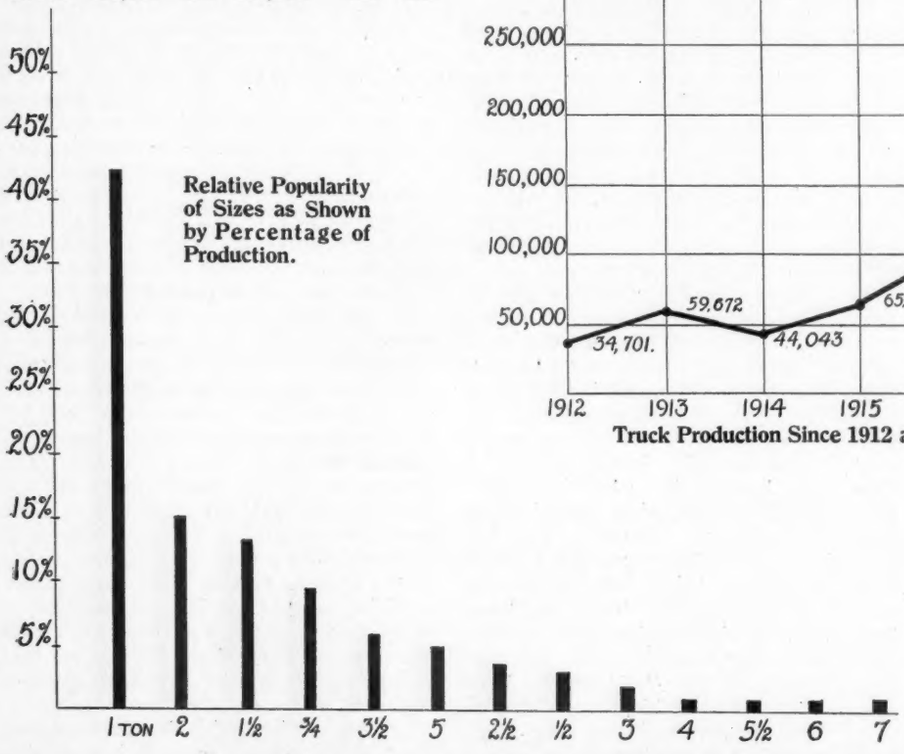
Let us all help, not hinder. There is no such a thing as free service. Therefore, if it cost money, charge for it; if we are wrong, admit it. Give uniform treatment. Make anything worth while worth money to be appreciated and some of our problems will be simplified.

Wonderful Progress of the Truck Industry, as Shown by Production Figures

THAT there is a slight dent in the production curve, due to the close of the war and the subsequent reaction cannot be denied, but that this is not serious is evident at once by a glance at the production curve. It will be seen that ever since 1914 there has been a very steady increase in production, that the 1918 figure of 227,250 trucks, which included war orders, has probably been slightly exceeded in 1919. It is impossible to get exact figures, but various estimates range between 230,000 and 250,000. The estimates for 1920 all show that the makers are planning an increased production, which would not be the case if they did not believe thoroughly that there would be a market for these trucks. These figures run all the way from 350,000 to 400,000 for the 1920 production. Looking at the matter conservatively, we believe that there will undoubtedly be produced more than 300,000 trucks, let us say 325,000. These figures are shown graphically on the accompanying chart. This army of trucks will be produced by approximately 225 manufacturers. It is noteworthy that although the number of makers varies from month to month the average number of makers has remained almost constant since 1911.



Truck Production Since 1912 and Estimated Production for 1920



Another curve shows very clearly the popularity of the various sizes of trucks as based on the feeling of the makers in 1919 as to the number of trucks of each size that it would be wise to produce. This shows very conclusively that the one-ton size is far in the lead, closely followed by the 2-ton, 1½-ton and ¾-ton models. Of the larger sizes the 3½-ton is the most popular, closely followed by the 5-ton. The outlook for 1920 is very bright indeed.

Highway Transportation Conference During New York Show Week

That the Highway Transport Conferences, to be held in conjunction with the National Motor Truck Shows at New York and Chicago, will be the most comprehensive and important yet held, is indicated by the announcement just made of the subjects to be discussed and a partial list of those who have accepted invitations to speak.

The feature of the Conference sessions will be the liberal use of illustrations, both in the nature of stereopticon slides and motion picture films. An added feature will be motion picture shows, lasting one-half hour or more, and following the sessions, each afternoon and evening. For these "movies" a large number of films, dealing with motor transportation in all of its varied phases, are being collected.

The conference will open on the evening of January 3rd in New York and the evening of January 24th, in Chicago, with important inaugural sessions. The general subjects of highways and motor transportation will be discussed in a broad way, with special reference to the economics involved. During the remaining six days of each show, conference sessions will be held in the afternoons, primarily intended for those engaged in motor truck business, including manufacturing, distribution and service, and in the evenings, primarily for motor truck owners, operators and for shippers and any others interested in motor transportation. However, all sessions are open to the general public and every one is cordially invited. On the closing day of each show there will be a single joint session in the afternoon.

Selden District Sales Managers Discuss Salesmanship

One of the most enjoyable get-together meetings of the district sales managers and officers of the Selden Truck Corporation was held at Rochester on December 3d, under the guidance of the vice-president of the company, Hal Boulden.

After the banquet a mock trial occupied the attention of the salesmen. Cast, of the Firestone Tire & Rubber Co., in cap, wig and gown dispensed justice and proved that all good salesmen must be actors. A. R. Kroh, of the Goodyear Tire & Rubber Co., was the garrulous farmer, while C. A. Musselman, general manager of the Chilton Co., Philadelphia, was the prisoner at the bar, charged with knowing truck salesmanship. Traffic cops brought up the rear.

In defending his knowledge of salesmanship, Mr. Musselman, who was really

(Continued on Page 90)

List of Motor Truck and Parts Exhibitors at New York Show

The List of Exhibitors at the Chicago Show Will Appear in Our Next Issue

Acason Motor Truck Co., 431 Brooklyn Ave., Detroit, Mich.
Acme Motor Truck Co., Cadillac, Mich.
American Motor Truck Co., Newark, Ohio.
Armleder Sales & Serv. Co., 332 Ave. B, N. Y. C.
Atterbury Motor Car Co., Buffalo, N. Y.
Autocar Co., Ardmore, Pa.
Bethlehem Motors Corp., Allentown, Pa.
Brockway Motor Truck Co., Cortland, N. Y.
Clyde Cars Co., Clyde, Ohio.
Commerce Motor Car Co., Detroit, Mich.
Corbitt Motor Truck Co., Henderson, N. C.
Commercial Truck Co. of Amer., Philadelphia, Pa.
Turnbull Motor Truck & Wagon Company, Defiance, Ohio.
Denby Motor Truck Co., Detroit, Mich.
Diamond T Motor Car Co., Chicago, Ill.
Dodge Brothers, Detroit, Mich.
Dorris Motor Car Co., St. Louis, Mo.
Federal Motor Truck Co., Detroit, Mich.
Four Wheel Drive Motor Truck, Webberville, Mich.
Garford Motor Truck Co., Lima, Ohio.
Graham Bros., Evansville, Ind.
Gramm-Bernstein Motor Truck, Lima, Ohio.
Huffman Bros. Motor Co., Elkhart, Ind.
Indiana Truck Corp., Marion, Ind.
International Harvester Corp., Chicago, Ill.
Jackson Automobile Co., Jackson, Mich.
Nelson Motor Truck Co., Saginaw, Mich.
Kelly & Springfield Motor Truck, Springfield, Ohio.
Kissel Motor Car Co., Hartford, Wis.
H. J. Koehler Motors Corp., 155 Ogden St., Newark, N. J.
Lewis-Hall Iron Works, Detroit, Mich.
Maccar Truck Co., Scranton, Pa.
Master Trucks, Inc., 3132 S. Wabash Ave., Chicago, Ill.
Maxwell Motor Co., Detroit, Mich.
Nash Motors Co., Kenosha, Wis.
Olds Motor Works, Lansing, Mich.
Oneida Motor Truck Co., Green Bay, Wis.
Packard Motor Car Co., Detroit, Mich.
Paige-Detroit Motor Car Co., Detroit, Mich.
Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Rainier Motor Corp., Flushing, L. I., N. Y.
Reo Motor Car Co., Lansing, Mich.
Republic Motor Truck Co., Alma, Mich.
Rowe Motor Mfg. Co., Lancaster, Pa.
Sandow Motor Truck Co., Chicago, Ill.
Sanford Motor Truck Co., Syracuse, N. Y.
G. A, Schacht Motor Truck Co., Cincinnati, Ohio.
Schwartz Motor Truck Co., Reading, Pa.
Selden Motor Vehicle Co., Rochester, N. Y.
Standard Motor Truck Co., Detroit, Mich.
Sterling Motor Truck Co., Milwaukee, Wis.
Stewart Motor Corp., Buffalo, N. Y.
Sullivan Motor Truck Corp., Rochester, N. Y.
Trailmobile Co., Cincinnati, Ohio.
Transport Truck Co., Mt. Pleasant, Mich.
Three Point Truck Co., Newark, N. J.
Triangle Motor Truck Sales Co., 381 4th Ave., N. Y. C.
Union Motor Truck Co., 2d & Water Sts., Bay City, Mich.
Velie Motors Corp., Moline, Ill.
Vim Motor Truck Co., Philadelphia, Pa.
Walker Vehicle Co., 531-45 W. 39th St., Chicago, Ill.
Walter Motor Truck Co., New York City.
Ward Motor Vehicle Co., Mt. Vernon, N. Y.
Ward La France Truck Co., Elmira, N. Y.
J. C. Wilson Co., Detroit, Mich.
Winther Motor Truck Co., Kenosha, Wis.
Commercial Car Unit Co., 18th and Glenwood Ave., Philadelphia, Pa.

Trailers on Floor With Truck Exhibits

Hayes-Diefenderfer Co., 1872 Broadway, N. Y. C.
Warner Mfg. Co., Beloit, Wis.

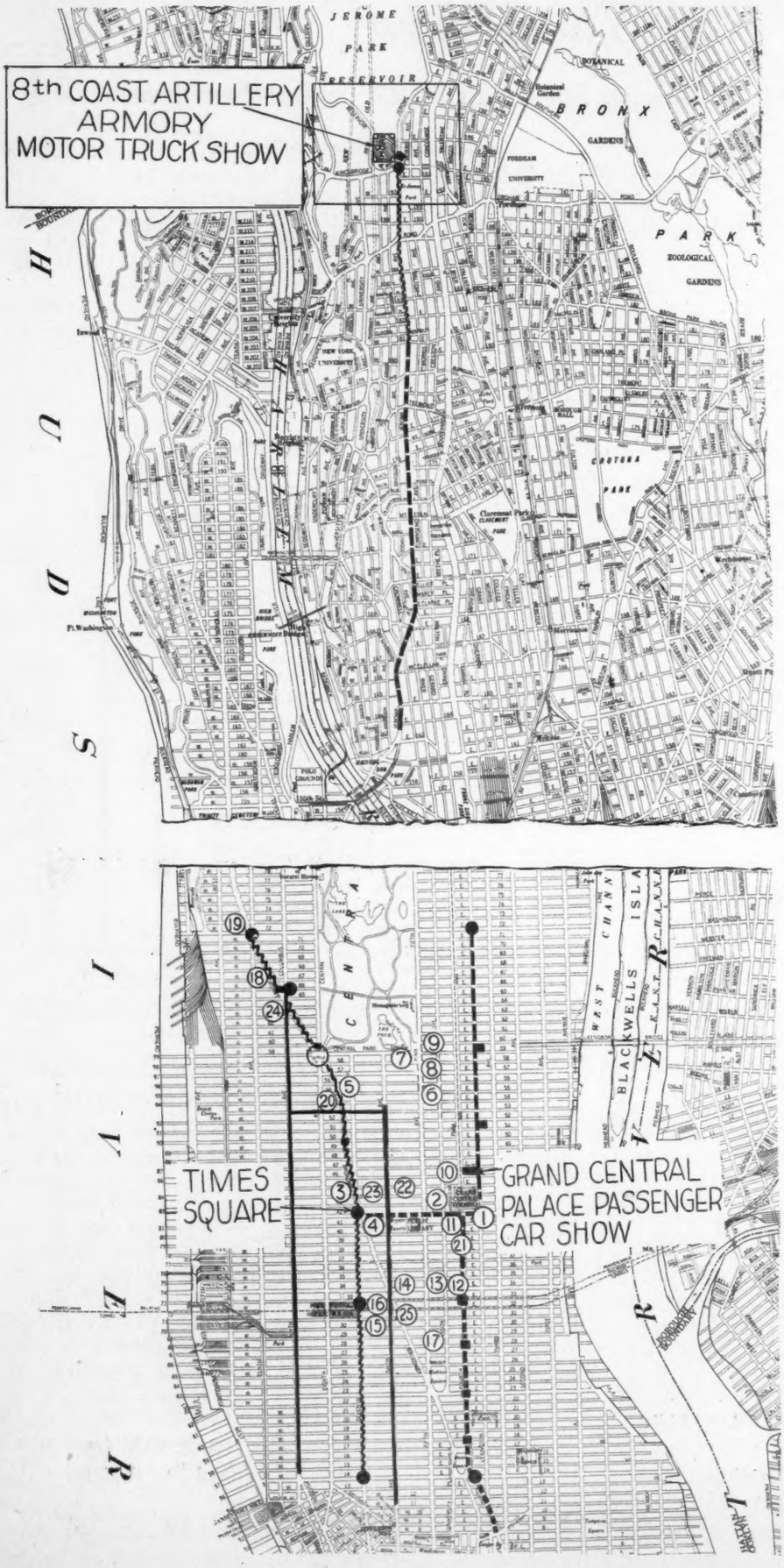
Exhibitors of Equipment

Aluminum Brazing Solder Co., Philadelphia, Pa.
Aluminum Castings Co., Cleveland, Ohio.
Amer. Bosch Magneto Corp., Springfield, Mass.
Amer. Chain Co., Inc., Bridgeport, Conn.
Amer. Ever Ready Wks., L. I. City, N. Y.
Amer. Hammered Piston Ring Co., Baltimore, Md.
American Machine Co., Newark, Del.
American Taximeter Co., New York.
Apollo Magneto Corp., Kingston, N. Y.
Arrow Grip Mfg. Co., Glens Falls, N. Y.
Baush Machine Tool Co., Springfield, Mass.
J. V. Bendus, New York.
Buda Co., Harvey, Ill.
Byrne, Kingston & Co., Kokomo, Ind.
Challoner Co., Oshkosh, Wis.
Clark Equipment Co., Buchanan, Mich.
Commercial Investment Trust, N. Y.
Continental Motors Corp., Detroit, Mich.
Dayton Steel Foundry Co., Dayton, Ohio.
Dixon, Jos. Crucible Co., Jersey City, N. J.
Duplex Engine Governor Co., Inc., Brooklyn, N. Y.
Eastern Machine Co., So. Easton, Mass.
Eisemann Magneto Co., Brooklyn, N. Y.
Empire Axle Co., Dunkirk, N. Y.
Franklin Mach. & Tool Co., Springfield, Mass.
Gray & Davis, Inc., Boston, Mass.
Hercules Motor Mfg. Co., Canton, Ohio.
Hero Mfg. Co., Philadelphia, Pa.
Houpert Machine Co., Long Island City, N. Y.
Hudson Motor Specialties Co., Philadelphia, Pa.
Humil Corp., New York City.
Iron City Products Co., Pittsburgh, Pa.
Jaxon Steel Products Co., Jackson, Mich.
Lauraine Magneto Co., N. Y. C.
Lobes Body Co., Inc., Mt. Vernon, N. Y.
Mead-Morrison Mfg. Co., East Boston, Mass.
Merchant & Evans Co., Philadelphia, Pa.
Motor Compressor Co., Newark, N. J.
Pantasote Co., New York City.
Parker Axle & Prod. Corp., N. Y. C.
Parry Mfg. Co., Indianapolis, Ind.
Robertson Cradlelock Wheel Co., Chicago, Ill.
Russel Motor Axle Co., Detroit, Mich.
Schrader's, A., Son, Inc., Brooklyn, N. Y.
Sewell Cushion Wheel Co., Detroit, Mich.
Splitdorf Electrical Co., Newark, N. J.
Standard Steel Castings Co., Cleveland, Ohio.
Stromberg Motor Devices Co., Chicago, Ill.
Torbensen Axle Co., Cleveland, Ohio.
Vacuum Oil Co., N. Y. C.
Vaporizer Utilities Sales Corp., N. Y. C.
Wellman-Seaver-Morgan Co., Akron, Ohio.
West Steel Casting Co., Cleveland, Ohio.
Wheeler-Schebler Carburetor Co., Indianapolis, Ind.
Af-Ford-Able Sales Co. of N. Y., Inc., N. Y. C.
Horizontal Hydraulic Hoist Co., Milwaukee, Wis.
Minneapolis Steel & Mach. Co., Minneapolis, Minn.
Service Engineering Co., New York.
U. S. Specialty Co., Boston, Mass.
Wisconsin Motor Mfg. Co., Milwaukee, Wis.

Bodies on Main Floor With Truck Exhibits

Metropolitan Body Co., Inc., 430 Grand St., Bridgeport, Conn.
Parry Mfg. Co., Indianapolis, Ind.

How to Get to the New York Motor Truck Show



Key to Hotels

1 **Commodore,** Lexington Ave. & 42d
2 **Biltmore,** Madison Ave. & 43d
3 **Astor,** Broadway & 44th
4 **Knickerbocker,** Broadway & 42d
5 **Woodward,** Broadway & 55th
6 **St. Regis,** Fifth Ave. & 55th
7 **Plaza,** Fifth Ave. & 59th
8 **Netherlands,** Fifth Ave. & 59th
9 **Savoy,** Fifth Ave. & 59th
10 **Ritz-Carlton,** Madison Ave. & 46th
11 **Belmont,** Park Ave. & 42d
12 **Vanderbilt,** Park Ave. & 34th
13 **Waldorf-Astoria,** Fifth Ave. & 34th
14 **McAlpin,** Broadway & 34th
15 **Manhattan,** Madison Ave. & 42d
16 **Pennsylvania,** Seventh Ave. & 32d
17 **Prince George,** 14 East 28th
18 **Marie Antoinette,** Broadway & 67th
19 **Ansonia,** Broadway & 72d
20 **Cumberland,** Broadway & 54th
21 **Murray Hill,** Park Ave. & 40th
22 **Seymour,** 50 West 45th
23 **Claridge,** Broadway & 44th
24 **Empire,** Broadway & 63d
25 **Imperial,** Broadway & 31st

Key to Map

Lexington—Fourth Ave.

Express Stations

Broadway—Seventh Avenue Shuttle; Times Square to Grand Central and Vice Versa

L or Elevated

Subways

Out of town motor truck dealers attending the commercial car show in New York City, January 3-10, will be obliged to journey up into the Bronx to Jerome Avenue and 194th Street, the Kingsbridge Road Station. It can be reached by either the subway or elevated. The visitor will also find a change in the subway service, namely the shuttle which operates between Times Square of the Broadway subway (west side) and Grand Central, Lexington and Fourth Avenue (east side).

How to Use Shuttle

Use of the shuttle will be simplified if one will remember that it serves as a connecting link between the west side or Broadway subway and the Lexington or Fourth Avenue subway. Assuming one arrives at the Pennsylvania station and desires to go direct to the truck show at

the Eighth Coast Artillery Armory and by the subway. Enter the subway entrance in the railroad station. Signs indicate the up and down town trains and platforms. The inside platforms are for express and the outside for local trains. Use either an express or a local to Times Square, it being one station up town from Pennsylvania.

Follow the Black Line

On leaving train at Times Square avoid exits marked "To the Street," and look for a black ribbon on the ceiling. There will be signs marked "East Side Subway" and "Lexington and Fourth Avenue." Follow the black line, and the crowd, to the shuttle train which stops at old Grand Central. After leaving shuttle train continue to follow black line and go through tunnel to Grand Central. Do not go up stairs after leaving shuttle unless you wish to go to the Grand Central railroad station.

At Grand Central look for sign "Lexington and Jerome Avenue" and descend stairs to the UP TOWN platform, taking either an express or a local train carrying a marker "Jerome Avenue." Remain in train until the guard calls Kingsbridge Road which is the truck show station. If one wishes to return to the Pennsylvania station, reverse the process but follow the green line from the shuttle to Times Square.

From Automobile Row to Armory

Visiting dealers stopping at hotel on Broadway and vicinity above 42d Street or who wish to inspect automobile row that extends from 46th Street to 66th, can travel on the subway to the show for one fare, a nickel. Assuming one is stopping at the Hotel Ansonia (19 on map) Broadway and 72d Street. This is an express station on the west side subway. Take the down town express, get off at Times Square and follow the black line to shuttle, etc., as previously explained. To return, reverse the process, following the green line at the shuttle.

Elevated Runs to Truck Show

The Sixth or Ninth Avenue elevated or L trains run to the Kingsbridge Road station. One can use a Ninth Avenue changing at 135th Street to a Sixth Avenue. The trains running to the truck show station are marked "Kingsbridge Road" or "Woodlawn."

Dealers crossing from New Jersey via the Hoboken, 23d Street, West Shore R. R., Erie, C. R. R. of N. J., by ferries landing at 23d Street, can use the Ninth Avenue L, taking the train at the 23d Street station, an up town train. Those arriving on the D. L. & W. can ferry to Desbrosses Street, taking the Ninth Avenue L at Desbrosses Street. As may be noted by the accompanying map the Sixth Avenue L trains use the Ninth Avenue tracks from 53d Street up town, and upon returning down town from the show one can use a Ninth Avenue L and change at 66th Street if he wishes to stop at any points served by the Sixth Avenue train below 53d Street.

The truck show is best reached from the Grand Central Palace by subway, the Lexington or Fourth Avenue. Inasmuch as the Grand Central Palace is located between 46th and 47th Streets on Lexington Avenue, one has the choice of walking up Lexington Avenue four blocks to the 51st Street subway station, a local or down Lexington to the entrance to the Grand Central subway on the Lexington Avenue side of the Commodore Hotel.

Running Time About the Same

The running time of the subway to Kingsbridge Road is 29 min., that of the L 35½ min. Contrary to the general belief one can make as nearly good time by using a local.

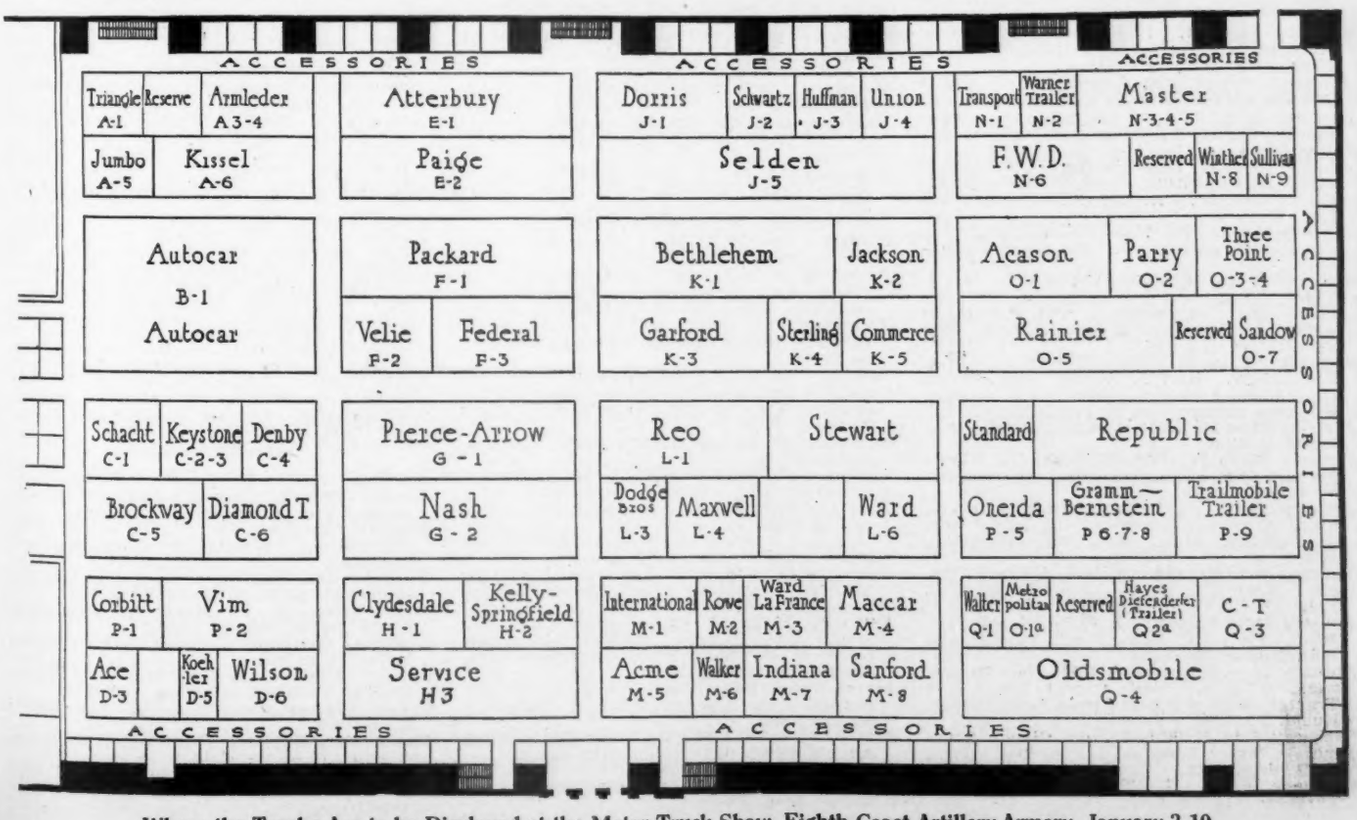
Surface Car Service

Owing to the distance of the Armory from the hotel section and Grand Central Palace, use of the surface cars is not practical. Surface cars may be utilized from Lexington Avenue and 42d Street or the Grand Central station to visit Automobile Row on Broadway or the hotels between Times Square (Broadway and 42d Street) and up town. Take car marked Broadway. Cars marked "Crosstown" do not go up or down Broadway.

How to Use Map

An accompanying map shows the approximate location of a number of hotels, these being numbered or keyed. To use key first locate your hotel and then determine which is the better to use to reach Kingsbridge Road, the L or the subway. If located below 42d Street on the Lexington or Fourth Avenue subway, one will not be obliged to make any change at Grand Central but can ride direct to the Kingsbridge Road station provided a Jerome Avenue train be boarded.

One can go from the Grand Central Palace to Columbus Circle, the heart of automobile row, by using the shuttle, and taking an up town local train at Times Square on the west subway to Columbus Circle or 59th Street. New York is easily navigated, to use a nautical expression, if one will bear in mind that Fifth Avenue separates the east and west streets, that the small numbers of each begin at Fifth Avenue.



Where the Trucks Are to be Displayed at the Motor Truck Show, Eighth Coast Artillery Armory, January 3-10

News of the Trade in Brief

Census of Manufacturing Plants to be Taken in January

WASHINGTON, Nov. 24.—The Motor industry of the United States, represented by the various manufacturing establishments connected with it, will be called upon to keep open house for one or more days at least during January, with a certainty that there will be callers in the person of representatives of Uncle Sam. There is nothing alarming or forbidding in this suggestion, but, on the other hand it means that an opportunity will be offered the industry to put its best foot forward and to show the world through the coming Fourteenth Decennial Census just what it stands for today.

The growth of the motor industry, of course, has been phenomenal in the last few years, the truck business, particularly, coming to the front insofar as the number of machines manufactured and put on the market is concerned. When it is taken into consideration that the industries of the country were for the most part in a subnormal condition in 1914, when the last census was taken, further reason is suggested as to why the manufacturers of motor machines individually and as a whole will be able to show up by comparison with the last census, a condition which should be more than gratifying to them.

The government is seeking to facilitate census taking by mailing to every manufacturer in the country, this, of course, includes the builders of trucks and passenger cars, a schedule to be used in tabulating the information wanted by this particular branch of the country's industrial resources. This schedule should go out in December and failure on the part of any motor manufacturer to receive one should cause him to write to the Chief Clerk of the Census Bureau at Washington asking that he be supplied.

The census enumerators are expected to make their calls some time in January and to the end that these calls be expedited each builder of a motor machine, whether it be a motor truck, passenger car, tractor, motorcycle or what not, should study the schedule sent him in advance of the arrival of the enumerator. Should he do this it is possible he may have the schedule completely filled out in advance, but, in any event, he will be able to so understand it as to answer the questions therein promptly and intelligently. Also, in this way, many manufacturers of motor machines be the more certain that their industry gets just the place to which it is entitled when the statistics taken by the census enumerators are compiled and published.

Officers of the Census Bureau are looking forward rather confidently to somewhat surprising figures being developed by the industrial compilation.

The inquiries relating to manufactures, as specified by the Act of Congress providing for the Census, include the name and location of each manufacturing establishment; character or organization, whether individual, corporate or other form; character of business or kind of goods manufactured; amount of capital actually invested; number of proprietors, firm members, co-partners and officers, together with the amount of their salaries; number of employees and amount of their wages; quantity and cost of materials used in each establishment; quantity and value of products; principal miscellaneous expenses; time in operation during the year; character and quantity of power used, and character and number of machines employed.

Coming Events

December 27 to January 4, 1920—Akron, O.

January 3 to 10, 1920—New York City. Commercial Cars and Accessories; Eighth Coast Artillery Armory.

January 6 to 8, 1920—Omaha, Neb. Mid-West Implement Dealers' Assn. Auditorium. James Wallace, Sec., Council Bluffs, Ia.

January 10 to 17, 1920—Montreal, Canada. Automobile Show. Almy's Building. T. C. Kirby, Mgr., Windsor Hotel.

January 17 to 24, 1920—Montreal Auto Trade Association Show. Grand Palace.

January 17 to 24, 1920—Cleveland, O. Auto Show. Wigmore Coliseum. Fred H. Caley, Mgr.

January 17 to 24, 1920—Hartford, Conn. Thirteenth Annual Auto. Dealers' Show. Broad Street Armory. Arthur Fifoot, Mgr., 135 Church St.

January 19 to 24, 1920—Philadelphia, Pa. Commercial Car Show. Commercial Museum.

January 19 to 24, 1920—Schenectady, N. Y. Third Annual Auto Show. Benefit Machine Gun Companies E and F. State Armory. Direction J. J. Callahan, Box 808, Pittsfield, Mass.

January 19 to 25, 1920—Milwaukee, Wis. Auto Show. Bart J. Ruddle, Mgr., Room 316, Brumder Bldg. Trucks, cars, trailers, tractors, motorcycles, accessories.

January 21 to 25, 1920—Spokane, Wash. Automobile Show.

January 24 to 31, 1920—Chicago, Ill. Commercial Cars and Accessories; International Amphitheatre.

January 26 to 31, 1920—Amsterdam, N. Y. State Armory. Benefit of Co. H. James J. Callahan, Mgr., Box 808, Pittsfield, Mass.

January 31 to February 6, 1920—Kansas City, Mo. Motor Car Dealers' Show. Overland Bldg. E. E. Peake, Mgr.

January 31 to February 7, 1920—Minneapolis, Minn. Twin City Auto, Truck, Tractor and Industrial Exposition.

January 31 to February 7, 1920—New Brunswick, N. J. Second Annual Truck and Tractor Show of Motor Trade Assn. W. A. Kuehl, Mgr., 99 Albany St.

February 2 to 7, 1920—Toledo, Ohio. Automobile Show. Terminal Auditorium. Hugo V. Buelow, Mgr.

February 9 to 11, 1920—Wichita, Kans. Thresher-Tractor Club.

February 9 to 13, 1920—Louisville, Ky. Annual Good Roads Show and Convention of American Road Builders' Assn.

February 9 to 14, 1920—Greenfield, Mass. State Armory. Benefit of Co. A. J. J. Callahan, Mgr., Box 808, Pittsfield, Mass.

February 9 to 19, 1920—Nashville, Tenn. Automobile Show.

February 10 to 14, 1920—Quincy, Ill. Second Annual Automobile, Truck and Tractor Show.

February 14 to 21, 1920—Brooklyn, N. Y. Motor Vehicle Dealers' Assn. Show. (Cars and Trucks). 23rd Regiment Armory. I. C. Kirkham, Mgr., 1635 Bedford Ave.

February 15 to 20, 1920—St. Louis, Mo. Automobile Show.

February 16 to 20, 1920—Manchester, N. H. (Only show in state). Academy. J. J. Callahan, Mgr., Box 808, Pittsfield, Mass.

February, 1920—Deadwood, S. D. Deadwood Business Club's Seventh Annual Show. F. R. Baldwin, Mgr.

February 16 to 21, 1920—Kansas City, Mo. Fifth Annual National Tractor Show. Kansas City Tractor Club. Guy H. Hall, Mgr., Sweeney Bldg.

February 21 to 28, 1920—Ottawa, Ontario. Motor Show.

February 23, 1920—Pittsfield, Mass. State Armory. J. J. Callahan, Mgr., Box 808.

February 23 to 28, 1920—Portland, Ore. Dealers' Motor Car Assn. Show. Passenger cars and accessories only. M. O. Wilkins, Mgr., 312 Commonwealth Bldg.

February 23 to 28, 1920—Louisville, Ky. 12th Annual Louisville Auto Dealers' Assn. First Regt. Armory.

February 24 to 28, 1920—Kansas City, Mo. Motor Car Dealers' Show. Convention Hall. E. E. Peake, Mgr. Passenger cars, trucks and accessories.

March 1 to 6, 1920—Buffalo, N. Y. Eighteenth Annual Auto Dealers' Show. Broadway Auditorium.

March 1 to 13, 1920—St. Louis, Mo. First Annual Mississippi Valley Exposition.

March, 1920—Jersey City, N. J.

March 3 to 6, 1920—Lancaster, Pa. Auto Trade Assn. Show.

March 13 to 20, 1920—Boston, Mass. Eighteenth Annual Automobile Show. Chester I. Campbell, Gen. Mgr., 5 Park Square.

March 15 to 22, 1920—Wilkes-Barre, Pa. Automobile Show.

Society of Automotive Engineers

New York City, N. Y. Society of Automotive Engineers. Coker F. Clarkson, Sec., 29 W. 39th St. Society and Section Meetings: Dec. 17, Pennsylvania Section. Philadelphia. "Over and Back." A. K. Brumbaugh. Dec. 18, Metropolitan Section. New York. Torsional Vibrations and Critical Speeds. J. F. Fox and Prof. F. M. Lewis. Dec. 19, Detroit Section. Detroit. North Sea Barrage. Commander Fullinwider, U. S. N. Jan. 6 to 8, Annual Meeting. New York. Jan. 7, Minneapolis Section, Minn. Four-Wheel Drive vs. Caterpillar. Jan. 13, Chicago. Aeronautics. Jan. 23, Joint meeting Metropolitan and Pennsylvania Sections. Philadelphia. Diesel Engine. Jan. 27, Buffalo Section. Buffalo, N. Y. Feb. 4, Minneapolis Section. Minneapolis. Feb. 12, Tractor Dinner of the Society. Kansas City. Feb. 27, Pennsylvania Section. Pittsburgh. March 3, Minneapolis Section. Minneapolis. Dynamometer Tests. March, 23, Buffalo Section. Buffalo. April 7, Minneapolis Section. Minneapolis. Tractor Weights and Drawbar Pulls.

Foreign Events

Adelaide, Australia, March, 1920—All-Australia Exhibit. Motor vehicles, airplanes, engines and automotive equipment.

Brussels, Belgium, January 10 to 18, 1920—International Automobile Manufacturers' Congress. Motor Car Show.

Buenos Aires, Argentine, April 3 to May 4—Exposition of U. S. Manufactures.

Christchurch, N. Z., November—First National Motor Vehicle Show.

Glasgow, Scotland, January, 1920—Scottish Motor Exhibition.

London, England, April or May, 1920—Commercial Vehicle Exhibition. Olympia.

Lyons, France, March 1 to 15, 1920—Spring Exposition.

Manchester, England, February, 1920—North of England Motor Exhibition.

Pretoria, South Africa, March and April, 1920—(Overseas motor vehicles special features.)

The questions as outlined above will be covered by the general schedule which every establishment will receive. In addition to this a supplemental schedule will be sent to the 68 principal industries as classified by the Census Bureau. This supplemental schedule will allow detail statistics of output to be set forth under the heading "products manufactured."

The census of manufacturers is limited to manufacturing establishments with an annual product of at least $500 conducted under what is known as the factory system, exclusive of the so-called neighborhood, household and hand industries. However, no establishment is too small to be counted by the government if it comes within the definition of a manufacturing establishment.

Census Bureau officials emphasize the fact that all information gathered by the census is strictly confidential, made so by Act of Congress, and is for general statistical purposes only.

King Elected Vice President of Transportation Finance Company

The Transportation Finance Company, Inc., Wilder Building, Rochester, N. Y., has elected J. A. King first vice-president and director in their company.

Mr. King, formerly of the Continental Guaranty Company, of New York, is in personal touch with the general automobile trade throughout the country, and is considered the pioneer in automobile finance.

No doubt his connection with this company is quite an asset, and he is giving the Loan Department his personal attention. This company was organized in July, 1919, and is capitalized at $1,000,000 and assists both factories and dealers throughout the country in financing their automobiles and trucks.

Transportation Welfare Bureau

The National Touring Bureau of the B. F. Goodrich Rubber Co., announces that its scope of operation will be broadened to include the dissemination and distribution of all highway transport data. Henceforth it will be known as the Goodrich Travel and Transport Bureau. The new institution will strictly adhere to the following policy: "To promote highway transport service and to co-operate with all forms of transportation by land, water and air, in obtaining a more extended and efficient use of their respective facilities." Through its country-wide organization of branches, depots and dealers the bureau has already distributed upwards of 150,000,000 pieces of touring information on the motoring public.

Bradley Polytechnic Institute, Peoria, Ill., opened a course in storage batteries on November 11 which will continue for twelve weeks. Instruction is given in disassembling and repairing batteries.

Gasoline Specifications Standardized

The oil trade requested that the unnecessarily stringent specifications of October, 1918, be changed, as they were tending to restrict the total production of motor gasoline. As a result the Committee on the Standardization of Petroleum Specifications, Bureau of Mines, has made the following recommendations which became effective November 25, 1919:

(a) Boiling point must not be higher than 60 degrees C. (140 F.).
(b) 20 per cent. of the sample must distill below 105 degrees C. (221 F.).
(c) 50 per cent. must distill below 140 degrees C. (284 F.).
(d) 90 per cent. must distill below 190 degrees C. (374 F.).
(e) The end of the dry point of distillation must not be higher than 225 degrees C. (437 F.).
(f) Not less than 95 per cent. of raw liquid will be recovered in the receiver from the distillation.

Auto Farmer Company to Manufacture Trucks

The Auto Farmer Co., Kankakee, Ill., has been organized and will manufacture a new type of truck, especially designed for the farm. The officers have been elected as follows: President, A. E. Cook; vice-president and treasurer, R. W. Sayre; A. E. Cook, secretary; C. E. Ulrich, general manager; production manager, J. H. Mitchell. Two models have been produced, one of which is a one-ton combination truck and the other a two-ton truck. The truck is the result of ten years' experiments and has a spring suspension which greatly reduces vibration. The frame is composed of two rigid units, adjustable according to the requirements of the load, being lengthened or shortened as desired.

Seek Uniform Trailer Legislation

WASHINGTON, D. C., Nov. 20—At a recent meeting of the Federal Highway Council it was decided to incorporate the recommendations of the Trailer Manufacturers Association in the uniform traffic bill which is in the process of formation. These recommendations provided for the registration of trailers and semi-trailers, fix the annual fees, require one number plate, make various provisions for safety.

The uniform bill is now being redrafted to include these provisions and, after approval of the Trailer Association and the Associations of State Highways, will be offered at the Legislatures next January.

Clyde Cars Company, Clyde, O., is tabulating information upon which freight rates for return load bureaus and other motor transportation companies may base their rates.

Des Moines Truck Dealers Make Good

When the Des Moines Motor Truck Dealers' Association put on their week's truck tour through central Iowa in October, impassable roads made it impossible for the caravan to visit Chariton, Osceola and Creston, where big meetings had been arranged. At that time they promised dealers in these cities they would return at a later date with another caravan, and they made good on their promise November 13-15.

Eight trucks made the trip accompanied by Des Moines dealers, and demonstration hauling and big meetings characterized the tour in the several cities.

Over 300 dealers and business men attended the banquet and meeting at Chariton, the Chamber of Commerce and Motor Trades Bureau uniting in the biggest demonstration of its kind ever staged in the Iowa city. A. V. Comings, of the COMMERCIAL CAR JOURNAL, who had accompanied the National Motor Truck Development tour and several other truck tours, was the principal speaker and gave those present a clear idea of what these tours were intended to accomplish and of the increasing importance of the motor truck in farming operations.

At Creston a similar meeting was held, with even more present, and much enthusiasm was aroused over the prospects of introducing the motor truck more generally in the Creston district, one of Iowa's richest farming communities.

The tour promoted much closer relations between the cities touched and at Des Moines, and will be beneficial to the industry in many ways in the immediate future.

Buses as Railway Substitute

YOUNGSTOWN, OHIO, Nov. 19—The Mahoning and Shenango Railway and Light Company has been authorized by the city council to increase its capital by $16,000 for the purpose of purchasing four busses and erecting a waiting station. The automobile line is to be used as a substitute for the proposed extension of the city railway system to Lincoln Park.

Conservation of Storage Batteries Taught

INDIANAPOLIS, IND., November 18—The Prest-O-Lite Co., Inc., is holding a series of educational conventions for distributors in order to put storage batteries in the public utilities class. The lectures are being given by engineers from the Prest-O-Lite laboratories who make conservation one of the salient points of their lectures. These conventions are being held in Boston, New York, Richmond, Va.; Atlanta, Ga.; Indianapolis, Ind.; Chicago, Ill.; Omaha, Neb.; Kansas City, Mo., and Dallas, Tex.

The National Truck Owners' Conference a Success

The Detroit Truck Men agreed that the conference which closed Friday night, the last session of the Detroit conference, has been the most helpful practically of any meeting of the kind ever held in that city.

Representatives from the largest operators of trucks from Toledo, Cleveland, Buffalo, Pittsburgh, Akron, Battle Creek, Chicago and other cities explained how their fleets are cutting delivery time, increasing tire mileage, increasing gasoline mileage per gallon, lowering maintenance costs and making greater profits for them by use of best operating methods.

Several hundred Detroit operators attended and brought up for discussion practically every phase of motor truck operation. While several and practically all of the biggest fleets in Detroit were represented, the majority of the operators owned but two or three trucks. These smaller operators were able to learn how their costs can be cut from $1000 to $2000 per truck by better routing, cost keeping and other methods.

Others present were Harold P. Gould, chairman of the meeting; A. S. Herr, traffic manager of Bryant & Detwiler; E. C. Rumsey, superintendent of apparatus of the Detroit Fire Department; E. Knerr, auditor of the Cleveland Milling Co.; Frank C. Schmidt, vice-president and general manager of the Liberty Highway Co.; W. P. Thorpe, Jr., of the E. Ferguson Co.; E. F. Moreton, president, Detroit Transportation Association; H. H. Keating, assistant manager of the Standard Oil Co.; J. A. Hanley, transportation superintendent of the J. L. Hudson Co.; B. F. Tobin, Jr., assistant production manager of the Continental Motors Corp.

Youngstown Association Meets

YOUNGSTOWN, O., Nov. 20—The annual meeting of the Automobile Dealers' Association was one of the most successful ever staged from the standpoint of the promotion and welfare of the automobile industry. The meeting was addressed by Victor Moon, president of the Ohio State Association, who explained the new automobile law in Ohio. The meeting was followed by a banquet for members and visitors.

Campaign for Frequent Oil Changes

A campaign to call attention to the necessity of changing oil in motors every so many hundred miles has been advocated by M. L. Pulcher, vice-president and general manager of the Federal Motor Truck Co., Detroit, Mich. He contends that failure to change oil frequently is the main cause of the deterioration of motors.

Mr. Pulcher points out that there is so much kerosene in gasoline today that it has a tendency to run down past the pistons, get into the lubricating oil and thin it. The kerosene cuts the thin film of oil on the wearing surfaces of the pistons, piston rings and cylinder walls.

A recent experiment proved beyond a doubt the need for frequent changes. A motor was brought into a shop with almost .015 in. wear. The motor was ground to .020 in. oversize, fitted with new pistons, put on the block and filled with good, clean oil. The motor was then run continuously for 60 hr. and during this time the oil was changed three times.

When the motor was taken down it showed no wear.

The motor was again put together, oil was taken from an old truck and the motor put through the same 60 hr. test without any change of oil. It showed .005 in. wear, indicating that it is the non-lubricating qualities of the oil resulting from the kerosene working past the pistons and mixing with it that cause the deterioration of motors.

The age of a motor may almost be said to depend upon the number of times the oil is changed in it.

Census Plans Completed

WASHINGTON, D. C., Nov. 18—Plans for the manufacturers section of the fourteenth decennial census are about completed. It is aimed to make this the most complete inventory that has ever been made of the nation's industry. It has been firmly emphasized by the Census Bureau officials that this information is strictly confidential and is for general statistical purposes only. Therefore, for the good of industry in particular and the nation as a whole, all requested information should be given.

Republic Interests Change Hands

ALMA, MICH., Nov. 20—Control of the Republic Motor Truck Company, of this place, and the Torbensen Axle Company of Cleveland, O., has been acquired by W. R. Ruggles, president of the Republic Motor Truck Company; John N. Willys and W. J. Baxter. The Willys-Overland Co., Toledo, O., is in no way connected with transaction.

The Rockford Association Reorganizes

ROCKFORD, ILL. — Automobile Trade Association has been reorganized. President W. B. Taylor called the members together and suggested regular meetings hereafter. It was also decided to sub-divide the association into four divisions, one to comprise the dealers in passenger cars; second in trucks; third in tractors, and fourth in accessories.

Correction

Attention is called to a discrepancy made in a statement covering the Goodyear expansion, on page 21 of the November issue of the COMMERCIAL CAR JOURNAL. Mention was made of the number of tires turned out every twenty-four hours. It read 13,000, it should have read 30,000 auto and truck tires a day.

Do Motor Truck Tours Pay?

Fred W. McIntosh, of the Manbeck Motor Sales Co., distributors for Maxwell trucks in the Des Moines, Ia., territory, is no longer in doubt on the subject since the week's truck tour staged by the Des Moines dealers in October. Immediately after the Des Moines tour, which lasted a week and covered nearly 500 miles of Iowa farm country with 27 trucks, Mr. McIntosh had the following to say:

"This tour has been so successful that I think we ought to start planning right away for a thirty-day tour next year, to be run along lines similar to this one. I would like to see every truck leave Des Moines loaded with groceries and merchandise of all kinds for delivery along the way, and to have demonstration hauling arranged in advance at all stops. This has proved the big thing on these tours, to do actual demonstration hauling so that the farmer and the merchant can see for themselves the actual serviceability of motor trucks. Actual cost figures should be kept of all these demonstration hauls, and when the tour is over these figures should be put into pamphlet form, with an affidavit from the secretary of our association as to their genuineness, and thousands of them should be printed for distribution in this territory.

"Nothing could stop truck sales then."

New Advertising Partnership

PHILADELPHIA, PA., Nov. 19—Harry S. Buzby and W. Cortez Raughley have entered into a partnership and will handle advertising and merchandising under the name of the Buzby-Raughley Co. Mr. Buzby was connected with the advertising staff of Chilton Company for twelve years and Mr. Raughley has been associated with the Fletcher Co. for five years. They will confine their efforts chiefly to the automobile industry in which field their previous experience has been centered.

Eisemann Adds Contracts

BROOKLYN, N. Y., Nov. 25—The Eisemann Magneto Corporation has renewed its contracts for magnetos with the Winther Motor Truck Co., Dart Truck & Tractor Corporation and the Toro Motor Company. It has recently received contracts for magneto equipment for the "Dixie Flyer," the passenger car built by the Kentucky Wagon Company and for the "Argonne 4," a passenger car built by the Jersey City Machinery Company.

The Motor Service Company of Pennsylvania, Inc., Philadelphia, Pa., has recently reorganized the Service and Repair Department in order to establish a satisfactory repair service. Provisions have also been made for better storage facilities, thus enabling the cars to come in or out without interfering or colliding because of insufficient storage space.

Truck and Passenger Car Representatives Discuss Highways Transportation and Good Roads

DURING the week of the convention of the National Association of Motor Truck Sales Managers, Hotel Statler, Detroit, there were several notable luncheons. On Saturday, the 8th, the Goodrich representatives had as their guests a number of well known truck sales managers and Roy D. Chapin from the passenger car end of the business. Ways and means of increasing highway transportation and the good roads movement were discussed broadly by those present. The gathering was typical and indicative of the widespread interest which is now being manifested in the development of highways and their ultimate use as arteries over which all kinds of goods can be transported by motor truck.

Mr. Chapin gave to the group some of the information which has come to him from his past connection as chairman of the Highways Transport Committee of the Council of National Defense of Washington. He called attention to the growing feeling on the part of legislators that trucks should be limited as to size or else highly penalized by taxation. He spoke of the feeling in Indiana which has apparently risen between passenger car users of the roads and the truck operators. The passenger car drivers with but the one thought of damage to the roads in mind are advocating prohibitive taxes on trucks.

This same feeling, he said, was cropping up at Washington all the time and emphasized the necessity for the truck interests guarding against the adverse resultant legislation. He advocated a unity of action between the truck and trailer men. He made the statement that there are now less than 100,000 miles of what may be termed heavy duty roads of the 3,500,000 miles of roads in the country, and that even with the most active work on the part of everybody it will be years before we have anything like an adequate system of roads capable of carrying heavy truck traffic. The damage done to roads between Baltimore and Washington by army trucks has influenced legislation. These roads were not even macadam and were not built for such traffic.

He also touched upon the necessity for the introduction of courses in Highway Engineering in our universities. The Department of Agriculture, he said, had plenty of good practical road men, but no highway transport scientists.

R. C. Hargreaves, formerly secretary of the Highways Transport Committee of the Council, talked on the "Progress of Rural Express," and said that the farmers want it wherever it is understood by them and that adverse feeling or inertia on the part of legislatures usually disappears as soon as they are thoroughly informed on the subject and is due largely to a lack of knowledge on their part. He made a plea for a consistent effort on the part of the industry through suitable committees from the various organizations to see that the legislatures were well informed and also have courses on Highways Transport Engineering in our universities.

The Goodrich representatives passed out a little pamphlet, a suggestion to the National Association of Motor Truck Sales Managers, excerpts from which follow:

"Out of war's transportation challenge has come a new understanding of why we need and value roads. Many have labored long to secure good roads—and to obtain the road has been to reach the goal. Today the road is recognized as paving the way to a new end—namely, to stimulate traffic and then to carry it most economically."

"Michigan has been quick to appreciate these facts, and the great University at Ann Arbor is the first one in the country to provide courses of instruction in highways transport engineering. Professor Arthur H. Blanchard is in charge of this course."

"And what Michigan has set about to do in the interests of her citizens every other great State cannot fail to consider in the interests of its own people. So that it may not be inappropriate to suggest that the National Association of Motor Truck Sales Managers appoint a committee which will put itself at the disposal of the great universities of the various States to aid them in handling the problem of highways transport in the best interests of their own people."

Truck and Railroad Men to Meet

Through the efforts of C. W. Reid, manager, of the Transportation Bureau, of the Federal Highway Council, of Washington, arrangements are being made for the truck interests and the railroad interests to get together and determine just what is the status of the motor truck on the road as a carrier. The relation between the motor truck and the railways will be taken up by a committee of the Federal Highway Council and the men appointed by the American Railway Association. The following is the list of the railway men who will confer:

E. J. Pearson (Chairman), Federal manager, New York, New Haven & Hartford R. R.

C. G. Burnham, Federal manager, Chicago, Burlington & Quincy R. R.

J. E. Gorman, Federal manager, Pennsylvania Lines West of Pittsburgh.

F. B. Bowes, traffic manager, Illinois Central R. R.

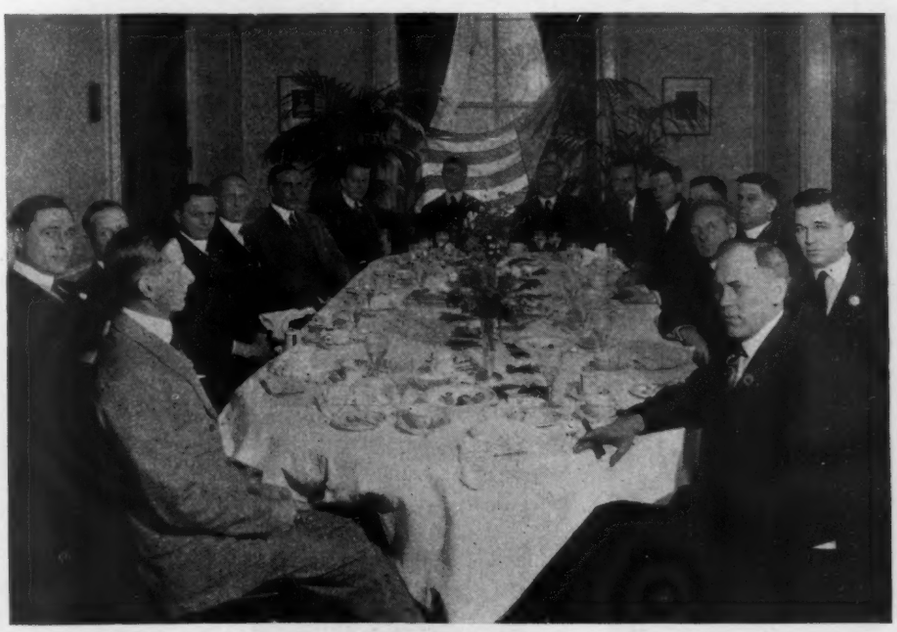
F. B. Houghton, freight traffic manager, Atchison, Topeka & Santa Fe R. R.

W. A. Newman, freight traffic manager, New York Central R. R.

G. D. Ogden, freight traffic manager, Pennsylvania R. R.

E. H. Shaw, traffic manager, Southern R. R.

Forest City Machine & Forge Co., Cleveland, O., has acquired the plant of the Dorr Miller Differential, as well as the exclusive license for the manufacture and sale of the Dorr Miller differential.



Goodrich Luncheon

Left to right those present were: W. D. Rightmire, Winther Motor Truck Co.; Raymond Beck, Goodrich Co.; J. H. Bowman, Garford Co.; C. Ayers, Denby Truck Co.; S. V. Norton, Goodrich Co.; C. S. Pike, Page Detroit Motor Car Co.; R. C. Hargreaves, Goodrich Co.; Roy D. Chapin, Hudson Motor Car Co.; J. E. Tracy, Sterling Motor Truck Co.; E. T. Herbig, Service Motor Truck Co.; A. C. Burch, Clydes Car Co.; James O. Meara, Goodrich Co.; F. W. Fenn, National Automobile Chamber of Commerce; E. S. Foljambe, Chilton Co.; and A. C. Hanson, Goodrich Tire & Rubber Co.

Personal Items

Alexander W. Barber has been selected as field secretary for the Motor and Accessory Manufacturers' Association. He will travel about the country and keep in direct personal touch with the various members of the Association.

John J. Behle has been chosen manager of the Cincinnati Automotive Trades' Association.

F. G. Beirn has succeeded Fred G. Browning as manager of the Philadelphia branch of the White Motor Company.

John L. Bender is now associated with the C. A. S. Engineering Company, Detroit, Mich., which represents the Pollak Steel Company. He was formerly sales manager of the Anderson Forge & Machine Company.

S. E. Bennett has accepted the sales management of the Rainier motor truck in the state of Pennsylvania.

L. E. Bixler, formerly purchasing agent for the U. S. Metal Goods Company, is now associated with the Packers' Machinery & Equipment Co.

Geo. E. Branderberger will represent the Rainier Motor Corporation as sales manager in Maryland, Delaware and the District of Columbia.

L. A. Brown has succeeded J. M. Dine as special truck tire sales representative for the Firestone Tire & Rubber Company in the Northwest, with headquarters at Minneapolis.

Hugh Campbell has been appointed to the faculty of the Ambu Engineering Institute, Chicago.

H. P. Carter has been named manager of the Chicago branch of the Buick Motor Company. His territory includes Illinois, Iowa, Wisconsin, Missouri, and part of Indiana.

V. V. Casey has been named eastern sales supervisor for the Norwesco chemical automobile utilities, manufactured by the Northwestern Chemical Company. His territory will include the eastern section of the United States from Canada to the Gulf.

C. H. Chambers has been named distributor of Rainier trucks in New York State. He will have his headquarters at 1114 Main St., Buffalo, N. Y.

Allan H. Clark, former secretary of the Vehicle Top and Supply Company, is now associated with the Gardner Advertising Company, St. Louis, Mo.

C. W. Curtiss has severed his connection as director and general manager of the Splitdorf Electrical Company. He is going to take charge of affairs of a large automobile accessory business whose headquarters will be located in Newark, N. J.

J. P. Davis has been elected president of the Purchasing Agents' Association, Chicago, Ill. He is purchasing agent of the Belden Manufacturing Company.

C. E. Dawson has been made zone sales manager, with headquarters at Flint, Mich., of the Chevrolet Motor Company.

Joe M. Dine has been made branch manager of the Firestone Tire & Rubber Company, Dallas, Tex. Mr. Dine was formerly special representative of the truck tire sales department in the Northwest with headquarters at Minneapolis.

Arthur E. Dixon has been appointed advertising manager of the Torbensen Axle Co., Cleveland, O. He has been previously associated with the advertising department of the Packard Motor Car Company and the Hupp Motor Car Corporation.

Percival Dodge has been appointed sales manager, in charge of all domestic sales, for the Denby Motor Truck Co., Detroit, Mich. Mr. Dodge has been in the employ of the company for a number of years, having attained his present position as a result of a series of promotions for his splendid service.

R. M. Tussing
Who has been promoted to general supervisor of sales for the Northwestern Chemical Company. He was formerly advertising manager.

F. J. Druar has been made chief engineer of the Standard Motor Truck Company, Detroit.

W. A. Fisher will superintend the sales of the Rainier Motor Corporation in the state of New York, having his headquarters in Rochester.

Chas. H. Gresslee has been appointed sales manager in the Middle West for the Rainier Motor Corporation. His territory will extend to Omaha.

Miss Theresa Hegeley has been appointed advertising manager of the Essenkay Products Company, Chicago, Ill.

C. S. Hyman has been appointed advertising manager of the Standard Motor Truck Co., Detroit, Mich.

J. B. Lakin is in charge of the distribution of Rainier trucks in New England. He will have his headquarters in Boston, Mass.

K. J. Leach is in charge, as sales manager for the Rainier Motor Corporation, of a large territory including Texas, Louisiana, Arkansas and Oklahoma.

C. P. Lord has been appointed district manager in charge of the Detroit district office in upper and lower Michigan for the Willard Storage Battery Company, Cleveland, O.

Malcolm McCormick has been placed in charge of sales and advertising for the Gasket Division of McCord Manufacturing Co., Inc.

C. C. Meade has been appointed zone sales manager of the Chevrolet Motor Company. He succeeds F. G. W. Sudrow and will have his headquarters at Kansas City, Mo.

W. H. Metz, after one year and a half in the government service, will represent the Burd High Compression Ring Company as district representative for the state of Iowa.

R. B. Miller has been appointed sales manager of the Rainier Motor Corporation in southern Ohio, Tennessee, Kentucky and West Virginia.

M. J. Moore has been chosen secretary and treasurer of the LaFayette Motors Company, Mars Hill, Indianapolis, Ind.

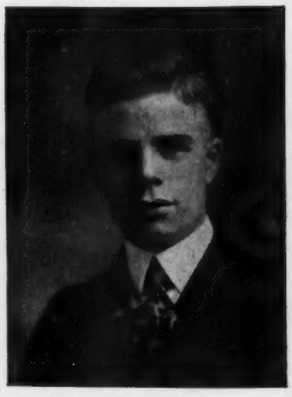
George Mueller has been appointed manager of service at the home office of the J. I. Case Plow Works, Racine, Wis.

Frank S. Murray and **Joseph A. Simek** have joined forces with George E. LaVietes and organized George E. LaVietes, Inc. The firm, which has its headquarters at 1834 Broadway, will act as a selling organization for factories.

N. B. Keller
Who has been appointed supervisor of distributors and field agents for the Service Bearings Company. He will make Detroit his headquarters.

W. B. Rushton
Who is president and general manager of the Master Tire & Rubber Company, manufacturers of Master cord tires, Dayton, Ohio.

Harry D. Chapin
Has been made vice president in charge of sales, advertising and sales promotion of the Manhattan Motors Corporation, distributors of Selden trucks.



W. C. Hanson
Who has been made branch manager of the Bearings Service Company, at New Orleans. He was formerly connected with the New Orleans branch.

F. C. Vail

Who has been chosen sales manager of the Master Tire & Rubber Company, Dayton, O. He was formerly salesman and branch manager of the Diamond Rubber Company.

H. W. Ross

Recently returned from overseas service in the Motor Transport Corps, has been elected vice president of Templeton, Kenly & Company, Limited, Chicago, Illinois, manufacturers of Simplex jacks.

C. E. Williams

Who has severed his connections with the Selden Truck Corporation and is now general sales manager of the Sanford Motor Truck Company, of Syracuse, New York.

J. E. Pickens

Formerly of the Federal Motor Truck Company, has been placed in charge of the newly formed advertising department of the Selden Truck Corporation, Rochester, New York.

William Nash has resigned from the Timken Detroit Axle Co., and is now sales manager of the Beaver Manufacturing Co., Milwaukee, Wis.

Burton W. Newhall has been appointed general sales manager of the tractor division of the Dayton-Dowd Company, Quincy, Ill.

Franklin Schneider has been elected vice-president of the Van Dorn & Dutton Co., Cleveland, O. Mr. Schneider is president of the Van Dorn Electric Tool Co.

R. J. Schuler has been named supervisor of cost production and purchases for the Detroit Gear & Machine Company.

F. W. Sinram has been elected president of the Van Dorn & Dutton Co., gear specialists, of Cleveland, O. Mr. Sinram is also president of the American Gear Manufacturers' Association and treasurer of the Van Dorn Electric Tool Co.

R. W. Sutherland has succeeded C. W. Curtiss as general manager of the Splitdorf Electrical Company. He will continue in his official capacity of secretary of the company.

C. M. Wallace, who was recently with the Purchasing Department, Body Division, of the Packard Motor Car Company, is now purchasing agent of the Standard Motor Truck Company.

Charles N. McFarland

Charles N. McFarland, general manager of the Jaxon Steel Products Division of the General Motors Corp., Jackson, Mich., died on November 1st, following an operation for appendicitis.

New Agencies

Black & Decker Manufacturing Co., Towson Heights, Baltimore, Md., have opened an office at 201 Maynard Building, Seattle, Wash. The office will be in charge of A. E. Nordwall and will work in conjunction with the Main Pacific Coast office of the company, 918 Hearst Building, San Francisco, Cal.

International Motor Company, New York City, has opened a branch at 2309 Chester Ave., Cleveland, O. The branch, which is known as the International-Mack Corporation, supersedes the Malin Motor Company. I. C. Moller is in charge.

Manhattan Motors Corporation has succeeded the Export House of Gaston, Williams & Wigmore as greater New York distributors for Selden trucks. The new corporation will have its sales and service headquarters at 238 to 242 West 19th Street. Edmund N. Stone is president, and H. D. Chapin, vice-president in charge of sales, advertising and sales promotion.

Outlook Company, Cleveland, makers of Outlook windshield cleaners, Outlook rubber patch and Outlook Luster, have established a sales office at 250 West 54th Street, New York City.

Western Auto Supply Co., distributors of Columbia batteries, have opened their main offices at 905-7 Throckmorton St., Fort Worth, Tex.

Factory News and Capital Increases

Doehler Die Casting Company has purchased a seven-acre piece of land in Chicago, on which it will erect a one-story concrete steel and brick structure for the manufacture of die castings and bearings. The building will be ready for occupancy about January 1. The main office and factory of the company is located at Brooklyn, N. Y. There is a branch plant at Toledo, O.

International India Rubber Corporation, South Bend, Ind., manufacturers of South

L. C. Rockhill

Who has been appointed to fill the newly created position of sales manager for the Goodyear Tire & Rubber Company, Akron, Ohio.

Chas. S. Crawford

Who is assistant general manager and director of engineering of the Premier Motor Corporation, Indianapolis, Indiana.

Frederick P. Nehbras

Who is general manager of the Premier Motor Corporation, Indianapolis, Indiana.

Grant C. Nicol

Who has succeeded Geo. Crane as manager of the Chicago branch of the Garford Motor Truck Company, Lima, Ohio.

Bend tires, are about to build a one-story building which will add 12,870 sq. ft. to their floor space. They are planning two additional buildings, the construction of which has been necessitated by the great demand for their products.

Service Motor Truck Company, Wabash, Ind., has begun the construction of Unit E of its factory. The addition, which will be 75 x 775 feet, is planned to take care of the increased production necessary to supply the demand for Service trucks.

McCulloch Manufacturing Co., Sandwich, Mass., has just completed a new plant with 15,000 ft. of floor space, which will be devoted to the manufacture of McCulloch timers for Fords.

Sewell Cushion Wheel Company, Detroit, Mich., has purchased a factory site of ten acres, on which it is planning to erect a new factory which will permit it to increase its production 200 per cent. It is hoped that this addition will enable the company to meet the demands of its branch houses, of which there are 36 at present.

Napoleon Motors Co., Traverse City, Mich., manufacturers of Napoleon trucks, has completed plans for the expansion of its business. These plans include an increase in factory space by the erection of additional buildings to replace those which were burned.

Stewart Motor Corporation, Buffalo, N. Y., has declared, through its board of directors, its regular quarterly dividend of 2 per cent. on preferred stock and 2½ per cent. on common stock. The new nine-acre plant, recently purchased by the company, is now in full operation.

Raymond Engineering Corporation, New York City, manufacturers of Hilton High Pressure Tire Pumps, have purchased 15 acres of land at Farmingdale, L. I., on which they contemplate building a plant the work on two units of which is to be begun immediately.

Herschell-Spillman Motor Company, Tonawanda, N. Y., is enlarging both its plant and its production. It is planning to increase its output of four-cylinder engines from 45 to 100 per day. An addition is being erected at this time which will permit of the production of 100 six-cylinder engines daily.

Firestone Tire & Rubber Company, Akron, O., are planning to erect a large factory at Hamilton, Ontario.

Templar Motors Corporation has begun work on the $800,000 addition to its plant in Lakewood, near Cleveland, Ohio. The new building is of fireproof, concrete, steel and glass construction, and will have every modern improvement in factory construction.

Marion Tire & Rubber Company, Marion, O., has been purchased by R. C. Ellsworth and associates, Akron, O. The capital is to be increased to $750,000.

Automotive Corporation, Toledo, O., has issued contracts for the first unit of its factories in which it will manufacture farm tractors.

New Incorporations

R. E. Keller Company, Chicago, Ill., has been organized for the purpose of carrying on an advertising agency. The company, which is headed by R. E. Keller, will have its headquarters in the Otis Building.

Auto Farmer Company, Kankakee, Ill., has been organized for the manufacture of a truck which will be especially designed for use on the farm. Officers of the company include A. E. Cook, president and secretary; R. W. Sayre, vice-president and treasurer; C. E. Ulrich, general manager, and J. H. Mitchell, production manager.

Leather Parts Company, Indianapolis, Ind., has been organized for the purpose of manufacturing leather specialties for the automobile, truck and tractor trade. The business, which was formerly conducted under the name of the Otto Bunge Co., has been enlarged and reorganized. Officers of the company include: A. H. Olds, president; A. M. Fodrea, secretary and treasurer, and Otto Bunge, vice-president. The sales department will be under the supervision of the sales department.

Fitz John-Erwin Manufacturing Company, Muskegon, Mich., has been incorporated with capital stock of $100,000 for the purpose of manufacturing truck bodies and cabs which will be sold to the leading truck manufacturers.

Middletown Rubber Company, Inc., has been organized for the manufacture of "Middletown Cord" casings, inner tubes, and all other rubber products. Its factory will be at Middletown, Orange County, N. Y.

Klick Tubing & Braiding Co., Philadelphia, has been organized for the manufacture of flexible metallic tubing for autos, gas and air hose, a smaller line. Their plant, which is 60 x 80 feet, four stories, is located at 328-334 N. Randolph Street.

Removals and Trade Changes

Splitdorf Electrical Company, Newark, N. J., has moved its equipment, stock, etc., from its plant at Sumter, S. C., to a large and modern factory at Newark, N. J.

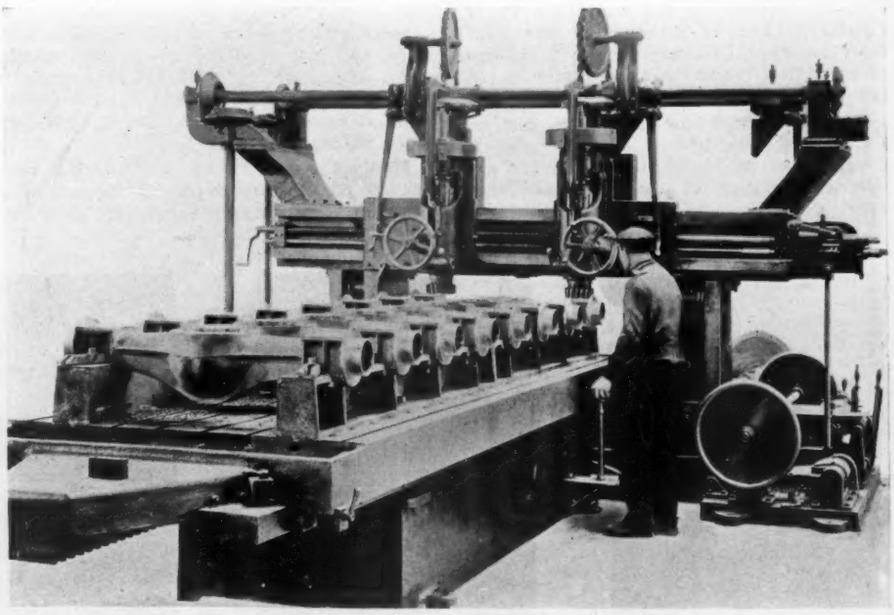
Swan & Finch, New York City, producers of greases, have purchased the interests of the Cataract Refining and Manufacturing Co., Buffalo, N. Y.

Master Tire & Rubber Company to Specialize on One Size

DAYTON, O., Dec. 1—The recently organized Master Tire & Rubber Company will specialize on a high grade cord tire and will make only size 30 x 3½. They aim, by concentrating on one size, to reduce overhead expense by at least 33 per cent. and so give the public an exceedingly high grade product at popular prices.

The first unit is now being constructed and will be in operation by the 15th of this month. The ultimate structure will be a six-story reinforced concrete modernly equipped building and will have a capacity of 15,000 tires per day. The first unit, which will contain about 20,000 sq. ft. of floor space, will have a capacity of 500 tires daily. Orders are already booked for the first year's output.

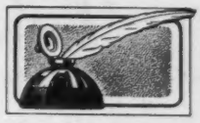
W. B. Ruston is president and general manager of the company. He has had many years' experience in the rubber industry including association with the Thermoid Company and the B. F. Goodrich Company. Other officers include Geo. H. Witsaman, vice-president and factory manager; John T. Nielson, secretary; Harry G. Egbert, treasurer and credit manager, and Frank C. Vail, sales manager.



Monster Planer Recently Installed by the Wisconsin Parts Company

To facilitate the production of Wisconsin axles, the company recently added a Beaman & Smith planer-type milling machine. This planer has four milling heads, permitting four operations on eight housings at one time. It is driven by direct current motors, directly connected with all controls in reach of a single operator. The total weight of the machine exceeds twenty-six tons, and the distribution of this weight is such as to insure the perfect and permanent alignment necessary to maintain the accuracy required by the manufacturers of Wisconsin axles. With this machine two hundred housings can be handled in an eight-hour day.

EDITORIALS



Solving the Service Problem

AS A get-together meeting of factory service managers the convention held in Detroit recently was a notable success. Discussing the inherent difficulties of their job would summarize in a few words the results accomplished. Certainly the interchange of ideas and discussions which followed most of the papers read cannot help but be of real benefit to the men who attended this meeting; but when it comes to advancing any pertinent thoughts or policies which would pave the way towards a solution of the service problems of today there was "nothing doing."

We cannot criticise the service managers for this, for the simple reason that the factory Service Department is not in a position to dictate to the factory officials and the Sales Department what they should or should not do. The Sales Department may listen to the suggestions of the Service Department, but, incidentally, pigeon holes have not as yet gone out of style.

We shall view the service problem strictly from the truck angle. To begin with, the truck owner needs service of a different character from the passenger car owner. The big idea in truck service is to furnish parts promptly and to install those parts in the minimum length of time. If something goes wrong with his truck, the owner wants the trouble corrected immediately. He doesn't want his truck held up for days and possibly weeks waiting for some part. And, furthermore, the average owner will not go to the dealer for parts or service—especially when that dealer is miles from where the particular truck happens to be—but he will look around for the nearest repair shop or independent service station. With the truck owner it is a question of time and the cost of the repair job is secondary in comparison to placing the truck into commission again.

The majority of truck owners today depend upon the independent repair shops for service, and this service is "paid" and not "free" service. The dealer who is in the habit of giving away service is only cutting his own throat and making it impossible for himself to continue in business. This is one of the direct causes for so many failures in the past among the retail establishments.

Also, sight must not be lost of the fact that the manufacturer is not in business to sell service, but to *manufacture trucks,* and that the average dealer is not in business to sell service but to *sell trucks.* Neither the manufacturer or the dealer would bother with the service problem factor if there was any way by which they could rid themselves of this burden. The only reason why the dealer hangs on to the Service Department is because of the profit in service and parts. The fact that there are today more independent repair shops in the country than there are dealers and that the independent shops have increased at a greater rate than the dealers during the past year is evidence enough to show that the independent shop is capable of doing as good and often better mechanical work than the dealers' service station.

From the foregoing it must be concluded that the average dealer is not giving the kind of service expected of him. Therefore, it will be seen that no organization of factory service managers, as was organized at the conclusion of the Detroit meeting, can ever hope to solve the service problem single handed. Such an organization can do a great deal toward improving service conditions, but it cannot do the work alone, especially in connection with truck service.

On the other hand, local service associations, such as have already been formed in New York City and Newark, N. J., under the title of Automotive Service Associations, can do an inestimable amount of good if supported by the truck and parts manufacturers, dealers and the proprietors of the independent repair shops in their respective localities. After a sufficient number of such local associations have been formed throughout the country, they can be combined into a national association, which could accomplish many things, such as develop standard repair systems, develop master parts lists, showing different parts which are interchangeable between different trucks; establish schools for training mechanics and develop standard fixtures and tools for the more important repairing and overhauling jobs.

After all is said and done, it is the parts situation that is causing most of the difficulties in solving the service problem from the truck angle. This is a matter for the truck manufacturers and parts makers to settle between them and the sooner this is done the better. Just as long as it is difficult to obtain parts there will always be service problems to contend with. In view of the fact that over ninety per cent. of the trucks built today contain standard units, there is no reason why these manufacturers and the parts makers cannot get together and co-operate in such a way that obtaining parts would become a simple matter.

A Service and Repairs Department, a new service to our readers, starts with this issue. In it there will be many valuable suggestions for increasing efficiency in the motor truck service station, including the methods used successfully by others. This department starts on page 99 of this issue.

Taken From Current House Organs

Motor Buses on Broadway

So long have we been accustomed to the street cars on Broadway that it will seem strange should they ever be discontinued. However, if a recent recommendation made to the City Fathers of New York, and to the street railway lines there as well, is adopted, Broadway will no longer look familiar to visitors.

A plan has been presented to establish motor bus lines to handle Broadway traffic and entirely do away with the present surface lines. The reason presented for the establishment of such lines is that the surface lines cause traffic congestion to an alarming extent and cannot under any circumstances handle the passengers who want to use them. Under present conditions the surface lines are slower than busses, their movements not so flexible, and they do not perform the service required of them, all of which appear to be mighty good reasons for the change to motorized equipment.

If New York makes the change, watch other cities where similar conditions exist. Just as soon as the bus proves its efficiency upon Broadway, as it has already done upon Fifth Avenue, the idea will spread until motorized equipment will take the place of the street car in almost every city of size. Already it has done so in the rural sections. Now let us watch New York.—U. S. Floating Power Plant News—United States Motor Truck Co.

Mark Twain on Salesmanship

Have you ever read Mark Twain's "Sermon to Salesmen?" The famous humorist went to church and heard a missionary talk. He says: "He was the most eloquent orator I ever listened to. He painted the benighted condition of the heathen so clearly that my deepest passion was aroused. I resolved to break a life-long habit and contribute a dollar to teach the gospel to my benighted brethren. As the speaker proceeded I decided to make it five dollars, and then ten. Finally I knew it to be my duty to give to the cause all the cash I had with me—twenty dollars. The pleading of the orator wrought me still further, and I decided not only to give all the cash I had with me, but to borrow twenty dollars from my friend who sat at my side.

"That was the time to take up the collection.

"However, the speaker proceeded and I lost interest and finally dropped off into a sweet slumber; and when the usher woke me by prodding me in the ribs with the collection plate, I not only refused to contribute, but am ashamed to state that I stole fifteen cents from the plate."—Log of the Long-Bell.—The Republic Radio, Republic Motor Truck Co., Inc.

The Flexible Dollar

When we read the letters of Pliny and Cicero, written over two thousand years ago, we find in these intimate pictures of Roman life practically the same conditions that prevail today, and that our old friend, the well-known High Cost of Living, was actively on the job the same as now.

Many self-confessed economists plead for more production as a means of reducing living costs, but is this the panacea for our ailment?

There is plenty of food in the world—more than ever before. More wheat, corn, meat, potatoes, butter, eggs and poultry. And, relatively, it is no higher in price. That is, twenty years ago a bushel of wheat would buy a bushel of potatoes, and it will do the same today.

It is the dollar that has changed in value.

We have a lot more dollars, so each individual dollar buys less than formerly.

Prof. Irving Fisher's plan to stabilize the dollar, making it as standard as the yardstick, retiring actual gold coin entirely from circulation, and varying the official weight of the gold dollar as often as necessary, perhaps twice a month, has the endorsement of men like Frank A. Vanderlip, Roger W. Babson, George Foster Peabody, and many other prominent bankers and financiers.

We ask lawyers for legal advice, physicians for medical advice, and get expert service from engineers when we build a truck or motor car.

Why should we leave our national financial affairs in the hands of professional politicians?

The Fisher plan may not work out successfully, but it has the endorsement of acknowledged experts in finance.—Timken Magazine—Timken-Detroit Axle Co.

And the Answer Is—

What made the four Liberty Loans and the Victory Loan the remarkable successes that they were?

What enabled the war department to carry to a successful end the selective service plan?

What enabled the Red Cross, the Y. M. C. A. and other relief organizations to raise millions of dollars during the war?

—And the answer is **publicity—advertising.**

If **publicity — advertising** — will win wars, direct the destiny of nations—if it will do all that, it will sell goods.

Advertising, someone has said, is multiplied information. He might have changed that axiom a degree and said, **Advertising** multiplies information. In other words it tells a vast number what a few already know.

The public has confidence in an advertised product. It knows that unless a product has merit it will not be advertised, at least not for any period of time. It has grown to expect a live, progressive concern to advertise. It is inclined to rate a firm's standing in the business community by its use (or lack of use) of printer's ink.

When a reader in perusing a national publication comes upon an advertisement of a certain article he doesn't, as a rule, think of the factories producing that particular article. Neither does he wonder who is at the head of the institution, or what standing it has in the industry.

He thinks immediately of its local affiliations. He is most interested in what it means to him, or to his family or his business associates or his neighbors.

A national advertisement is a local advertisement for the local dealer when that dealer is known to local buyers. And, local newspaper advertising makes a dealer known to more people in less time than any other means.—Haul-Age, The Garford Motor Truck Co.

In 1930

It was one minute of midnight, and a shipment of life-giving serum for the plague which had stricken the people of Honolulu had been expected from the government laboratories for an hour. The big express plane would be due to leave in five minutes for San Francisco, there to connect with the Pacific Sea Gull Express.

Crow, the assistant manager, took down the receiver of the wireless telephone and called the laboratory. "Hello—this is Transcontinental—the doctors at the other end depend on us, and you promised to have your stuff over here one hour ago—where is it?"

"It's leaving now in a fast express truck—should be there in 2¾ minutes," came the answer, "they have only five miles to go and all government-truck dispatches have ordered to give it right of way."

"All right—hope it does—it will save thousands of lives to say nothing of our reputation and thousands of dollars," said Crow and he rushed for the receiving platform on the truck elevated causeway, where just coming in sight was the truck bearing the precious shipment. Gasoline had saved the day (or night).—Traffic News, Federal Motor Truck Co.

Cameron Motors Corporation, Stanford, Conn., announces that their officers for the ensuing year include Everett S. Cameron, president: Leslie W. Holmes, vice-president and general manager; Pierpont B. Foster, treasurer; Albert C. White, production manager; Harry W. Dohery, director of sales, and F. S. Young and V. C. Morris, directors.

"It is impossible for me to find time to read all of the motor truck mediums in order to acquaint myself thoroughly with what is going on in the industry. I read carefully each issue of The COMMERCIAL CAR JOURNAL, as I know from years of experience that the information which your splendid magazine contains is authentic and reliable."

THE town of Canajoharie, New York, has been made famous by two products: one the Beechnut brand of foods, the other the well-known motor truck manufacturer, Mr. James R. Spraker, Vice President and General Manager of the Atterbury Motor Car Company, of Buffalo. After absorbing in a short period of time all of the knowledge that the Canajoharie High School was able to divulge, Mr. Spraker started in the hardware business in his home town. Later on, with the Fowler Nail Co., of Seymour, Connecticut, he "nailed" the reputation of being the best little old producer of horseshoe nail orders in the United States. In his seven years' connection with that company they were compelled to keep up a steady factory extension schedule. In 1910 he heard the call of the West, and went to Buffalo to cast his lot with the industry that was making the horseshoe nail business very much "down in the mouth." Since 1910 he has devoted his entire interests to the Atterbury Motor Car Company.

Its present conspicuous position in the motor truck industry is the most emphatic example of the human dynamo characteristics of Mr. Spraker's personality. Outside of that, his only joy in life is sneaking away, once in awhile, into the wilds of Newfoundland and Saskatchewan to bring back a pocketful of moose and caribou.

Why Many Rural Motor Express Lines Fail

Average Motor Truck Operator Lacks Knowledge of Marketing Conditions. Farmer Still Partial to the Commission Merchant

By C. P. SHATTUCK *

WHY is it that despite the fact that every person who has investigated the possibilities of the Rural Motor Express believes the plan practical that there are so few lines being operated in the East? By East is meant those states having cities of large population such as New York, Massachusetts, Pennsylvania, etc. And why is it that the few lines inaügurated discontinue service, suspend or change over to a general trucking business? These are some of the questions asked of the writer not only by truck dealers but by those interested in promoting the Rural Express movement.

Lest this article be misinterpreted, the writer desires to go on record as a staunch advocate of the Rural Motor Express. He believes in its possibilities, and a three months' trip in farming sections of the East has convinced him that some day we shall see motor trucks, and in vast quantities, hauling food products from the source of production to the city. This belief is based on talks with the big producers and men having to do with food distribution, persons who are anticipating the day when the present methods of transportation and distribution must be replaced by more economic systems.

In analyzing the reason for failure there are six phases that may be considered and these are: A, lack of intensive, detailed study of the subject by the operator; B, unfamiliarity with agricultural conditions; C, no definite knowledge of operating costs; D, distribution; E, failure of farm bureaus, etc., to cooperate; F, the gyp.

Fail to Know Conditions

Dealing with phase A. In practically every case of Rural Express observed by the writer the operators embarked in the venture without making an intensive, detailed study. In most instances these men became interested in the movement through publicity in the daily press. These glowing accounts led the reader to believe that fortunes awaited the purchaser of a truck, that the farmer would welcome motor highway transportation and that all the operator had to do was to drive up his truck, get a capacity load and be on his way to the city. Unfortunately nothing was mentioned in these publicity stories of the need of knowledge of transportation nor was it stated **how the truck operator could dispose of the farm products in the city,** a problem discussed under phase D.

With one exception the dealers selling these prospects were not better informed. Trucks have been sold to Rural Express operators for long hauls which could not be made to pay expenses unless they were operated with capacity load both ways, which they didn't. These concerns gave up after a very thorough trial. The leader selling the trucks did not know a thing about Rural Motor Express nor did he realize that in motor highway transportation the length of the haul and tonnage bears a very important relation to operating costs.

In another instance a dealer encouraged a prospect to undertake collections and deliveries that could not be completed within 20 hours and the singular thing about this case is that this dealer was located in the city where collection and distribution were to be made and he should have been familiar with the congestion in traffic in the sections the truck would operate.

Dealers' Responsibility

These dealers may object to this criticism but it may be asked: Is it good business to encourage a prospect to purchase a truck on time payments if said prospect be unfamiliar with the many peculiar problems of the Rural Motor Express and knows nothing of the fundamental principles of motor highway transportation? Can the prospect achieve success under these conditions? He may if he has sufficient capital and the ability to solve the problems as they arise from day to day. But the time payment type of purchaser as a rule overlooks business principles in his anxiety to meet his payments, and when they embark in the Rural Motor Express vehicle with limited capital either fail or develop a case of Gypitis as will be explained under phase F.

Coming to phase B, unfamiliarity of operators with agricultural conditions, this is second in importance. Too many have been led to believe that the farmer only awaits the opportunity to load his products on a truck for the city. As a matter of fact the farmer, while deeply interested in the Rural Motor Express, is more vitally concerned in who is going to take his products, where they are going and what he is going to get for them. If one were to canvass 100 farmers in as many different sections as to the Rural Motor Express 100 per cent. would ask two questions. The first is: What will I get for my stuff? Will it be more than I am getting now? Second: Will it cost me less by Rural Express than it does by the railroad? And it is a good person who can answer the first question to the satisfaction of the farmer. I have attended several meetings of farmers called for the purpose of listening to the proposed operators of Rural Express routes. Some of these were very well posted on the fundamental principles of the Rural Express but fell down badly when the audience began to ask pertinent questions dealing with the marketing of various farm products.

Successful exploitation of the Rural Motor Express requires that its operators be familiar with grading, packing and marketing farm products, how they have been shipped to market, the advantages and disadvantages of the conventional methods, costs or rates, seasonal products, quantities and the influence of the law of supply and demand on prices. The operator should know how each class of food products is distributed in the cities to be served by his carriers, sc that he can co-operate with educational and regulative agencies which eventually must become actively interested in the problem of food distribution. Furthermore, the Rural Express operator must obtain the confidence of the farmer. The latter should not be viewed as a "rube." He is far from it. The farmer of today is developing into a hard headed business man and is as keen for reducing costs and increasing profits as any business man. Securing the confidence of the farmer is not easy, but persistent and well directed efforts will be attended with success.

Phase C, operating costs. The failure of several operators of Rural Motor Express has been due wholly to their not anticipating or knowing operating and overhead costs. Invariably the procedure of estimation is to formulate a tariff based on that of the common carriers and without taking into consideration factors other than the fixed and operating costs of the truck. While it may be true that no well defined set of cost figures are obtainable in the Rural Express field, that is, definite, accurate figures, it is not always practical to accept cost figures of a given capacity truck in other lines of endeavor for they may not apply.

Losses by Pilferage

Few Rural Express operators in formulating their plans consider office rent, terminals, telephone, clerical help, loss by damage and theft, cost of pick-up and deliveries, etc. The loss by theft may be considerable, one Rural Express Company head stating that it cost $3000 in eight months for pilferage. Another cost

* This is the final of a series of articles dealing with the Rural Motor Express.

to be considered is that of agents along the route (where the trucks serve a number of towns) to solicit business. One company that has tried a number of plans states that the only practical one is that calling for the use of a salaried solicitor with an automobile. The commission man did not produce, said the head of this company, as he devoted but a part of his time.

Another expense that is always underestimated is that of picking up and delivering, and this applies to both the country and city end. The collections in the country can be made by a truck and a driver but in delivering the goods in the city will require a helper to guard the cargo. The closed and locked body has been suggested but with many pick-ups and deliveries to be made it is not held to be practical by those who have attempted the plan. Without the van or enclosed body insurance is not obtainable.

Distribution the Stumbling Block

Phase D, distribution, is, in the opinion of the writer and many farmers, the stumbling block in the path of the successful exploitation of the Rural Motor Express. We may inaugurate dozens of Rural Express lines, organize companies with plenty of capital and headed by men of transportation ability, but unless the producers are willing to ship to the commission man, the "farmer to the consumer," and "reduce the high cost of living" movement agitated so vigorously will not achieve the success hoped for by their foster fathers.

A man or company may purchase one, two or a dozen trucks and institute a vigorous educational campaign among the farmers. It will be possible to obtain the support of the farmers, they will ship by the trucks, but after securing the shipments what will the truck operator do with the products? He has one or two alternatives. The first is to carry the products to the commission man designated or favored by the farmer or attempt to peddle the products among the consumers or retail stores. The first plan is being carried out, but the farmer says he is no better off than under the old conditions, although it is true he is saved driving to the railroad.

Farmer to Consumer Not Practical

The farmer to the consumer via the Rural Motor Express is not as a rule, practical. The prohibitive costs of retail store or consumer distribution is too well known for further comment. It has been suggested that the Rural Express transport to a city market and sell on the same plan as do the farmers, but this would require the operator to be familiar with marketing, a good salesman of farm products and it is rare that a truck operator and salesman will be found in the one person.

The establishment of municipal consumers and wholesale markets has been advocated and is being done in New Jersey, but efforts to launch such movements meets with decided opposition by the commission houses or wholesalers. The writer was in a certain city in New York State this summer on the opening morning of such a market. To make a long story short, the wholesalers boycotted that market and successfully, too. This is possible through the influence over the retailers. Consideration must be given to the wholesalers. Financially and politically these organizations are strong, and, human like, seek to discourage, even by subtle methods, any attempt to disrupt conventional methods of distribution and buying. There are a few scattering places where farmers' markets have been established by the municipalities but these exist mostly in small cities and towns.

A Suggested Remedy

The failure to improve conditions in the larger cities is because no effort has been made to construct large wholesale markets where trucks can deliver from the farm or to improve terminal conditions and relieve traffic congestion. Opposition would certainly develop to the establishing of markets but it could be overcome by the right kind of educational work, by the co-operation of the carriers, educational and regulative agencies.

A remedy is suggested by one who has made a careful analysis of the conditions existing. He recommends the use of the Rural Motor Express for transporting farm products to a terminal and the formation of a company to develop a retail distribution. In other words, the plan savors of the principle in vogue with the wholesale or commission houses and it is further suggested that the farmers be a party to the plan.

Failure of Farm Bureaus to Co-operate

Phase F, failure of farm bureaus to co-operate. This subject was discussed by the writer in the September issue of the COMMERCIAL CAR JOURNAL. Almost every county in the agricultural sections of the United States has an agricultural agent or farm bureau manager, a man of practical farm experience and who has had special training. He is employed to assist local units of farmers in securing better methods of production and marketing, but too many of these agents are luke warm on the subject of the Rural Motor Express. Many do not know of it except by name and very, very few endorse it. I have yet to meet a Rural Express operator who admitted he ever received any assistance from the agent or bureau manager.

The Gyp, the Popular Subject

Phase F has to do with the gyp. Contrary to belief he is not born but is developed. Rare it is that a prospect buys a truck with an idea of beginning a cut rate business. Generally the gyp is attracted by the operation of trucks over a certain route and conceives the idea of following suit. With an initial payment he secures a truck and when business does not develop (but the notes do) he casts about for means of meeting his payments. Perhaps he is not a successful merchandiser of transportation. So he "offers" to haul the goods at a "better" rate than the other fellow, and thereby becomes afflicted with gypitis. The greater amount he is shy for the payment the better the rate. And this class of operators have invaded the Rural Express field. The head of one company operating a dozen trucks informed the writer that gypitis was largely the reason why his company discontinued its service and developed general trucking.

How the Gyp Operates

The company had arrangements with a certain producer to haul its products to the city. The rate and service were satisfactory. Along came the gyp and solicited business, offering a "better" rate. The shipper knew the Rural Express company but not the gyp. But the gyp had a trick up his sleeve. He went to the consignees and "influenced" them to instruct the shipper to ship by him; in fact, goods were thus ordered. This is but one of many subterfuges employed by the cut rate operator.

Two Rural Express company heads stated that they could have made a success were it not for the gyp and both men advocated legislation granting franchises as a remedy. Said one: "There is no inducement for a company to invest thousands of dollars in trucks and to build up an organization to engage in Rural Motor Express unless his investment can be protected. Our company lost about $25,000 before we placed the service on a paying basis and along came the gyp with his cut rates and practically drove us out of business. What is required is the granting of franchises and regulation of the service and rates by a body similar to the Public Service Commission. Success with the Rural Express can only be accomplished by large companies having ample capital and good organizations. We went into the plan being sold absolutely as to its practicability. We believe in it now and if franchises were granted to protect our investment we would inaugurate the service tomorrow. The education of the business man as to the gyp will not avail as the former is attracted by the prices. Even when a shipper gets stung he will fall again, for there is always a new gyp with a new story."

Failed, But Hopeful

Another Rural Express operator who spent considerable time and money in endeavoring to put over a service wrote the writer as follows: "You may be interested to learn that the business did not pan out as we thought. I did fairly well for a while but the natives when they found they were not getting any more money for their stuff dropped the truck and shipped the old way, by express, although they have to drive to the railroad and go after their empties. But I am sold on the idea and am going to make a strenuous attempt to gather in this business in the spring and am laying my plans. Hope to profit by my mistakes and there were some as you know.

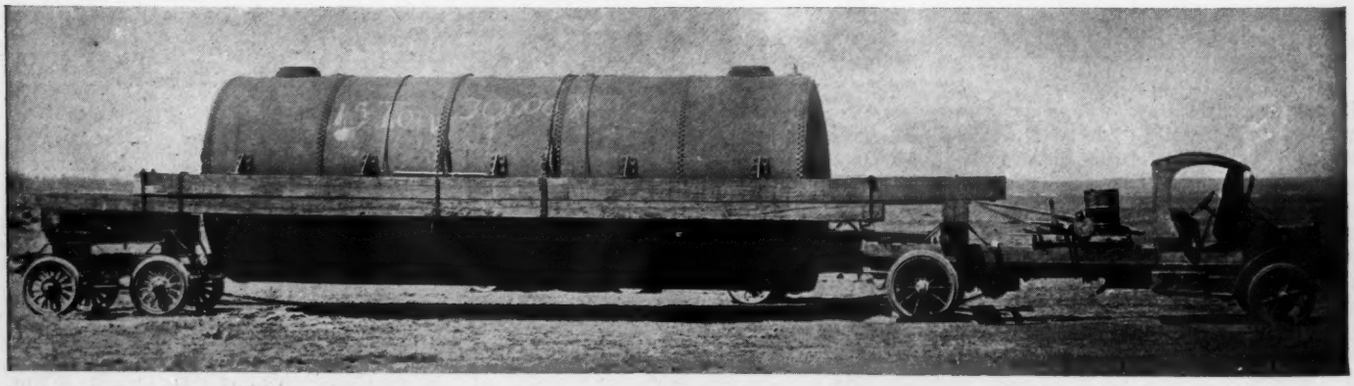
Unless some gyp gets in on my territory I am hopeful of putting the Rural Express over in this neck of the woods. In the meantime, I am doing general trucking and managing to make a little money."

Another letter received by the writer from a Rural Express company that started business early in the summer in New England contains the information that the company has gone out of business and sold its trucks. It was found that the rates were not sufficient to care for operating and overhead expense and that the capacity of the trucks were too small for the distance traveled. "We found we could not develop sufficient business on the return load to break even and that our greatest problem was the distribution of the farm products in the city. We do believe, however, that with proper equipment and an organization the service could be made to pay."

In summing up it may be said that much remains to be done before the Rural Motor Express will accomplish that for which it is intended in the East. In the West where conditions may differ the service has and is successful from the operator's point of view. It would appear that the logical solution of the problem is the education of the farmers to the need of forming co-operative marketing associations, of establishing their own markets and, perhaps, usurping the role of the commission or wholesaler. From a dealer's point of view the merchandising of trucks to such association or organizations should be more preferable than to the individual prospect who attempts the Rural Motor Express and who lacks the initiative or ability to make an intensive, detailed study of the problem.

Price List, Capacities and Inflation Pressures of Large Size Pneumatic Tires

	36 x 6			38 x 7			48 x 8			42 x 9			44 x 10		
	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure
Amazon Rubber Co., Akron, O.															
Amazon Cord, non-skid	98.60	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
American Rubber & Tire Co., Akron, O.															
Americord, non-skid	109.45	....	..	154.25	....	...	198.75	....	...	.....	....	...	.....	....	...
Bergougnan Rubber Corp., Trenton, N. J.															
Bergougnan Cord, non-skid	112.00	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Braender Rubber & Tire Co., Rutherford, N. J.															
Bull Dog Grip, Cord, non-skid	110.40	....	..	156.10	....	...	201.15	....	...	.....	....	...	.....	....	...
Firestone Tire & Rubber Co., Akron, O.															
Firestone Cord, Triple	99.45	2250	90	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Firestone Cord, non-skid	99.45	2250	90	140.65	2880	100	181.20	3660	110	226.95	4700	120	317.20	5850	130
Fisk Rubber Co., Chicopee Falls, Mass.															
Fisk Cord, non-skid	99.45	1700	90	140.65	2200	100	181.20	3000	110	.....	....	...	.....	....	...
General Tire & Rubber Co., Akron, O.															
General Cord, non-skid	106.25	2200	..	150.25	3000	...	193.65	4000	...	.....	....	...	.....	....	...
Goodrich, B. F. Rubber Co., Akron, O.															
Goodrich, Ribbed	99.45	2200	90	140.65	3000	100	181.20	4000	110	.....	....	...	.....	....	...
Goodrich, Safety	99.45	2200	90	140.65	3000	100	181.20	4000	110	.....	....	...	.....	....	...
Goodyear Tire & Rubber Co., Akron, O.															
Goodyear Cord, Ribbed	99.45	2000	90	140.65	2700	100	181.20	3650	110	.....	....	...	.....	....	...
Goodyear Cord, All-Weather	99.45	2000	90	140.65	2700	100	181.20	3650	110	226.95	4650	120	317.20	5800	130
Hewitt Rubber Co., Buffalo, N. Y.															
Hewitt Cord, non-skid	109.45	1700	75	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Mason Tire & Rubber Co., Kent, O.															
Mason Cord, non-skid	98.50	1700	..	139.30	2450	...	179.50	3300	...	.....	....	...	.....	....	...
Mohawk Rubber Co., Akron, O.															
Mohawk Cord, non-skid	119.70	....	..	.....	....	...	.....	....	...	.....	....	...	.....	....	...
Oldfield Tire Co., Cleveland, O.															
Oldfield Cord, anti-skid	104.42	2250	90	147.68	2880	100	190.26	3660	110	.....	....	...	.....	....	...
Pennsylvania Rubber Co., Jeannette, Pa.															
Vacuum Cup Cord	108.40	2200	90	153.35	3000	100	197.60	4000	110	.....	....	...	.....	....	...
Racine Rubber Co., Racine, Wis.															
Racine Multi Mile Cord, non-skid	98.20	2000	..	138.90	2700	...	178.95	4000	...	.....	....	...	.....	....	...
Sterling Tire Corp., Rutherford, N. J.															
Sterling Cord, non-skid	102.95	....	..	140.60	....	...	178.20	....	...	.....	....	...	.....	....	...
United States Tire Co., New York City															
U. S. Nobby Cord	99.45	2050	90	140.65	2750	100	181.20	3600	110	226.95	4650	120	317.20	5800	130



Fifty Miles in Nineteen and a Half Hours With This Load; That's Going Some!

This illustration shows how the Midwest Refining Company, of Casper, Wyoming, hauled a 30,000 pound still a distance of fifty miles, from Casper to Salt Creek, in nineteen and a half hours, on a five-ton White truck and two two and three-quarter ton two-wheeled Warner trailers, using a two-ton Diamond T truck as a pusher in going over hills. This was superintended by R. S. Crissey, transportation manager for the Midwest at that time, now in the transportation business for himself. It required thirty-six horses and ten men thirty days to move a still of the same dimension over the same road a short time previously.

LEGAL DEPARTMENT

Standards of Care in Driving Motor Trucks

The driver of a motor truck is under legal obligation to take notice of peculiar conditions of a street or road over which he is traveling, affecting his means of avoiding any collisions that may become imminent, declares the Pennsylvania Supreme Court in the case of Schoepp vs. Gerety, 107 Atlantic Reporter, 317.

Plaintiff, while walking at the intersection of 32nd and Arch Sts. in Philadelphia, was struck by a motor truck, owned by defendant and operated by an employee, when the truck skidded. He recovered judgment for $3500 and the Supreme Court has affirmed the award, saying, in part:

"The action of the car upon the application of the brakes, and the position in which it was at the time it finally stopped, might warrant the inference that it was traveling at a much higher speed than stated by the driver, or that, regardless of the question of actual speed, he failed to have it under such control as the condition of the street and the position of plaintiff required.
* * *

"The rights of plaintiff and of defendant's driver at the crossing were mutual, and each was bound to use such care, in view of the presence of the other, as the circumstances warranted.
* * *

"The driver was certainly aware of the slippery condition of the streets and presumably of the tendency of his truck to skid upon sudden application of the brakes; hence, it was his duty to approach the crossing with due regard to the rights of pedestrians. Whether he did so or not, the distance his car slid and the violence of the movement were matters properly for consideration in determining if, under the circumstances, he performed his duty."

When a "Lease" is Not a Lease

Just, as remarked by Mr. Shakespeare, the character of a rose is not altered by calling it something else, the Court of Chancery of New Jersey rises to declare that calling a document, under which possession of a motor vehicle is delivered to a prospective buyer, a "lease" will not make it such, where the whole instrument and the surrounding circumstances manifest mutual intent that the paper shall operate as a conditional sale contract. Or where it appears that title has passed to a buyer a purported lease will be treated as a chattel mortgage. (Rapoport vs. Rapoport Express Co., 107 Atlantic Reporter, 822.)

Defendant's business was that of motor transportation. It obtained a truck from a manufacturer under a contract which purported to be a lease. The agreement provided that the truck was leased to the defendant and that defendant should pay $1793 in ten monthly installments. At the expiration of the "lease" the defendant was to return the truck in as good condition as received, natural wear and tear excepted. But by paying $1 then defendant was entitled to become the owner.

In litigation that followed it became important, in determining the rights of the defendant's creditors, to decide whether this paper constituted a conditional sale contract or a lease. If it was a lease, it was valid as against such creditors and the assignee of the selling manufacturer was entitled to reclaim the machine. But, if it was a conditional sale contract, it was invalid as against the buyer's creditors because it had never been recorded, as required by the laws of New Jersey. The court holds that it was a conditional sale contract, saying:

"There is further provision that, if any of the rentals remain unpaid, the rights of the lessee in the motor vehicle shall cease and terminate absolutely, and the payments made by the lessee shall be forfeited. If the paper is what it purports to be (that is, a lease), I can see no significance whatever in this particular clause. There would be no forfeiture, because the lessee would have enjoyed that for which he paid, to wit, the use of the car for the portion of the term of the lease paid for. It is quite evident that the paper does not evidence a contract of leasing. The real agreement between the parties, evidenced by a paper such as this, is that for a certain consideration the one party sells the car to the other, who agrees to pay for it in monthly installments; title to remain in the seller until the installments have been paid, and then title to vest in the buyer. The insertion of the provision for the renting of the car for the term of the lease, and then for the sale for $1, is merely for the purpose of defeating the provisions of the conditional bill of sales act, so that there will be no necessity for record. This court will not tolerate any such evasion of the statute. To hold that the paper evidences such a contract as it purports to evidence would be to permit a fraud upon the statute, and it might as well be repealed."

So much for the legal status of a "lease" contract where the buyer has not completed payment of the agreed price. But the opinion of the New Jersey court goes further, by showing how and when a "lease" may become a chattel mortgage, which, like a conditional sale contract, must be recorded in order to be available against creditors of the mortgagor, bona fide purchasers for him, etc.

It seems that the buyer completed its payments and became thereby vested with title to the truck. But, in the meantime, the buyer became indebted to the seller for garage charges, etc., and the latter undertook to enforce a lien against the truck, and two other machines. To avoid embarrassment in having its trucks tied up, the buyer executed a new "lease" contract calling for an amount representing what the buyer owed the seller; the seller being named as lessor. Speaking of this paper, the court says:

"Now, at the time the paper was executed, title to this truck was not in the truck manufacturer. The installments had all been paid; title had vested, under the previous lease (the instrument being held to be a conditional sale), in the vendee, the Rapoport Express Company; there was no revesting of title in the truck manufacturer, which would put it in the position where it could make either a conditional bill of sale or a lease. The real transaction between the parties, I think, must be looked at, and I am of the opinion that, if this instrument were called either a lease or a conditional bill of sale, it would be a fraud on the chattel mortgage act. The result is that I hold the paper to be a chattel mortgage, and, inasmuch as it has not been properly recorded, it is void as against the creditors (of the mortgagor-buyer), and also void as against the receiver representing them.
* * *

"The entire scheme indicates that its purpose is to defeat the recording provisions of the conditional bill of sales act. If successful, parties may be permitted to purchase machines under some such agreement, and go out and obtain credit as if they owned them."

A New Plant for the Kelley-Springfield Company

The Kelly-Springfield Motor Truck Co., according to an announcement made by Pres. James L. Tedders, is contemplating extensive factory improvements to take care of the increased demands of the trade. Ground is being broken for the erection of a large factory and an attractive three-story office building.

Plans are being laid for the manufacture of 7500 Kelly trucks in 1920. The company has been called upon to take care of many new foreign orders in addition to orders booked in the United States.

Activities of the Motor Truck Association of Philadelphia

NEARLY 200 members and guests of the Motor Truck Association of Philadelphia at their monthly meeting at the Hotel Adelphia, on Wednesday evening, were highly enlightened and enthused by messages brought to them from two prominent motor truck men from the West on "The Future Possibilities of Marketing Motor Trucks to Farmers and Merchandisers in Districts Removed from the Great Population Centres."

Mr. J. E. Tracy, general sales manager of the Sterling Motor Truck Company, of Milwaukee, and president of the National Association of Motor Truck Sales Managers, and Mr. A. R. Kroh, a prominent Chicago automobile dealer, who was in charge of the recently conducted Truck Development Tour in the West, were the principal speakers. Both of them were so full of the remarkable demonstration of the 18 trucks which made a 60-day tour of 3600 miles over typical western roads, that the evening was not long enough to hear their entire message.

Mr. Tracy said that the aim of the National Sales Managers' Association was to create and develop such associations as the Philadelphia organization. He stated that the National Sales Managers' Association had 68 members who had the direction of the sales of a half billion dollars worth of motor trucks a year. One of their aims, he stated, was to try to clarify the atmosphere of motor truck selling, and he criticised the tendency in the West, which he thought probably prevailed elsewhere, of price cutting and of time payment extensions. Within a year or two he thought that it would be a question of making enough trucks instead of selling. He complimented Pennsylvania on its record of having more farmers owning trucks of 1½ to 2½ capacity in proportion to the farmer population than did many of the midde west states; and pointed out that the motor truck was destined to figuring more prominently in the future in doing the work of the farm and carrying produce to railroad and seaboard shipping points than heretofore. He gave way to Mr. Kroh to describe the "Truck Development Tour."

Mr. Kroh stated that he had learned in Philadelphia that remarkable things are being done in rural transportation service and cited one concern which is delivering merchandise to Reading and Allentown, respective distances of 60 and 65 miles, in four hours; whereas railroads take from four to five days. He pointed out that more than one-half of the motor trucks being sold to farmers in the country are being sold equipped with pneumatic tires which, he predicted, would be almost exclusively used in the future, where uncertain roads are encountered.

Mr. Kroh continuing said: "The farmer's greatest need today is machinery to take the place of the shortage of human labor, whether it be on jobs on the farm or in transporting its products to the market. The bureau of foreign management at Washington states that the efforts of 13 million people are necessary to supply the food wants of the American Nation. In 1915, 28 per cent. of the motor trucks sold to farmers were sold for cash and the balance on an average of seven years' time. Today, 84 per cent. are sold for cash, 8 per cent., on one year time, 2 per cent. on two years and 1 per cent. on three years' time. The farmer today is getting so rich, where he can get help, that many of them are retiring and it is a serious question how the produce of the country will be raised.

"However, in some western states production is increasing, due largely to modern equipment with farm machinery and motor trucks. Iowa produced last year 1,000,000 more hogs and 14,000,000 more bushels of corn than in the previous year. You can see what that required in transportation facilities. In Omaha alone 200,000 hogs were hauled to the packing houses in motor trucks in a year. There are 80,000 motor trucks in the U. S. today owned by farmers, and if you had accompanied us on the Truck Development Tour, you would have been astounded as to how hungry these rural business men are to secure equipment that will do their work cheaper and quicker than men. On our tour hundreds and even thousands of farmers and small town business men flocked into the centers where we stopped to see our demonstration work. They attended meetings to 12 and 1 o'clock in the mornings to hear our message. We worked right on the farm with them, loading and hauling stuff that they did not dream was possible.

"On the tour, we saw dealers making sales of trucks to men who had never before been prospects, although we were were not allowed to make any sales talks or to advance the interests of any one product.

A stirring and amusing address was made by the Rev. James J. Dean, president of Villa Nova College, on "Idealism vs. Commercialism." He stated that as an outsider he felt that the quality of the product was what made a repeat sale. He classified the necessities of good salesmanship must include: 1st, the salesman must know himself; 2d, he must know the goods; 3d, he must study the prospect; 4th, the personal element in both salesman and buyer must enter into every sale and 5th, the article must be well advertised. He had some pointed things to say about Bolshevism and labor unrest, but did not blame all of the latter on the working man, stating that there were evils to be corrected, but that he would suggest the passage of a law which would prevent any foreigner who has not become naturalized or taken out his first papers from becoming a member of any labor union.

Other speakers included Charles Grakelow, John Brock, ex-president of the Trenton Automobile Trade Association; E. J. Cattell, Walter Anthony, of the Committee appointed to confer with Professor Ash, representing the Board of Education, relative to the establishment of an Automobile Mechanics Training Course in the Public School. He reported that Professor Ash had invited the Committee to visit the Frankford High School to look over the building and arrange for suitable accommodations, and recommend the establishment of an experimental class in that school, provided the motor truck firms of the city would furnish parts of truck chassis for the students to work upon and he would endeavor to get an appropriation from the Board of Education to carry on the work.

Mr. E. J. Berlet reported on the Truck Show that the committee, composed of himself, Mr. W. H. Metcalf and Mr. J. H. Schumacker, had conferred with the Philadelphia Automobile Trade Association Show Committee from whom they had received a proposition to hold the Truck Show under the auspices of the Trade Association in co-operation with the Truck Association in the Commercial Museum from January 19 to 24, the week following the Passenger Car Show, the Truck Association members being admitted at the same rates as the Trade Association members. It was decided to hold the show that week.

The Committee on Nomination of Officers, who are elected at the next meeting, reported the following nominations for the next year: President, E. J. Berlet; vice-president, J. F. Cranston; treasurer, W. R. Walton; secretary, W. H. Metcalf. Directors for one year: Walter Y. Anthony; for two years, Thos. K. Quirk, F. A. Kissell and F. P. Gaul.

The meeting was presided over by the president, Thos. K. Quirk. An exceptionally pleasing program was led by Harold Armstrong, including orchestral numbers and solos by James McCool and Joe Kelly.

KEY OF ABBREVIATIONS

Used in the Specifications of Commercial Cars Listed on the Pages Following

In all specifications: { O—Own; Q—Optional }

Engine:
Cont—Continental
GBS—Golden, Belknap & Swartz
Her—Hercules
Hink—Hinkley
H-Sp—Herschell-Spillman
Lyco—Lycoming
Ster—Sterling
Vict—Victory
Wau—Waukesha
Wis—Wisconsin

Valve Location:
L—ELL-Head
T—TEE-Head
O—Overhead

How Cooled:
A—Air
C—Centrifugal Pump
G—Gear Pump
P—Water Pump
T—Thermo-Syphon

Radiator (Make or Type):
Bus—Bush
Can—Candler
EM—English-Mersick
Eur—Eureka
Fed—Fedders
Flex—Flexo
GO—G. & O.
Idl—Ideal
Lng—Long
McC—McCord
May—Mayo
Per—Perfex
R-T—Rome-Turney
Spi—Spirex
Stan—Standard
C—Cellular
T—Tubular
H—Honeycomb

Size of Tires:
*—Pneumatic
†—Dual

Lubrication:
C—Centrifugal Pump
F—Force Feed
G—Force and Gravity
B—Force and Splash
P—Water Pump

Carburetor:
B&B—Ball & Ball
Cart—Carter
Flch—Flechter
Ens—Ensign
Holl—Holley
John—Johnson
Mar—Marvel
Mas—Master
Mill—Miller
Strm—Stromberg
Shk—Shakespeare
Sheb—Schebler
Till—Tillotson
Zen—Zenith

Fuel Feed:
G—Gravity
P—Pressure
V—Vacuum

Ignition System:
AtK—Atwater-Kent
AuL—Auto-Lite
Bat—Battery
Bos—Bosch
Ber—Berling
Con—Connecticut
Del—Delco
Eis—Eisemann
Kin—Kingston
Mag—Magneto
NE—North East
POL—Prest-O-Lite
Sim—Simms
Spl—Splitdorf

Engine Starter:
L—Auto-Lite
B—Bijur
D—Dyneto
G—Gray & Davis
E—Leece-Neville
N—North East
W—Westinghouse

Clutch:
B—Borg & Beck
C—Cone
D—Disc
F—Fuller
G—Detroit Gear & Mach.
H—Hartford
L—Brown-Lipe
O—Own
Q—Optional
M—Merchant & Evans (Hele-Shaw)
U—Muncie
W—Warner
O—Own

Transmission:
B-Li—Brown-Lipe
Cott—Cotta
Covt—Covert
D-Sea—Driggs-Seabury
Det—Detroit
Durst—Durston
Full—Fuller
G-Lee—Grant Lees
MM—Mechanics Mach. Co.
Munc—Muncie
Plan—Planetary
Rock—Rockford
Selec—Selective
Warn—Warner

Location of Transmission:
A—Amidships
R—Rear
U—Unit with motor
UJ—Unit with Jackshaft

Final Drive:
B—Bevel Gear
C—Chain
N—Concentric Spur
E—External Spur Gear
F—Friction
I—Internal Gear
S—Spiral Bevel
P—Spur
W—Worm
R—Double Reduction

Universal:
Arv—Arvac
Bld—Blood Brothers
Flex—Flexite
Hart—Hartford
K-B—Kinsler-Bennett
M—Merchant & Evans
Pet—Peters
Spic—Spicer
Ster—Sterling
Ther—Thermoid
UM—Universal Machine
UP—Universal Products

Rear Axle:
Badg—Badger
Cel—Celfor
Chi—Chicago
Cl—Clark
Emp—Empire
Rock—Rockford
Russ—Russel
Sals—Salisbury
Shel—Sheldon
Stan—Stan-Par
Tim—Timken
Torb—Torbensen
W-M—Weston-Mott
Flot—Floating
½-Fl—Semi-Floating
¾-Fl—¾ Floating

Springs:
Bran—Brantford
Cham—Champion
Det—Detroit
GC—Garden City
Kal—Kalamazoo
Mar—Maremont
Math—Mather
Mer—Merrill
Nat—National
Per—Perfection
Row—Rowland
Shel—Sheldon
SP—Spring Perch
Stan—Standard Parts
Ster—Sterling
Tem—Temme
Tut—Tuthill
US—United States
Cant—Cantilever
Elip—Full Elliptic
S-El—Semi-Elliptic
¾-El—¾-Elliptic
S&C—Semi and Cantilever
S&¾—Semi and ¾-Elliptic

Steering Gear:
CAS—C. A. S. Products Co.
Dit—Ditwiler
Gem—Gemmer
Jac—Jacox
Lav—Lavine
W—Worm
Warn—Warner
Wohl—Wohlrab

Governor:
C—Centrifugal
Cont—Continental
Del—Delaney
Dup—Duplex
Hink—Hinkley
Mer—Merrill
Mon—Monarch
Pier—Pierce
Rug—Ruggles
Simp—Simplex
Wau—Waukesha

Wheels:
Arc—Archibald
AuW—Auto Wheel
Bim—Bimel
Cla—Clark
Day—Dayton
Det—Detroit
E&O—Eberly & Oris
Hay—Hayes
Hoo—Hoopes Brothers
Jon—Jones
Kel—Kelsey
Mil—Military
Mut—Mutual
Pru—Prudden
Roy—Royer
Sal—Salisbury
Sch—Schwartz
Smi—Smith
Sta—Stanwell
StM—St. Mary
Stn—Standard
Wan—Wayne
W&L—Waterhouse & Lester

Rim Equipment:
Bak—Baker
Det—Detroit
Fir—Firestone
Gdy—Goodyear
Jax—Jaxon
Kel—Kelsey
Stn—Standard

In Electrics

Battery:
Exid—Exide
Edis—Edison
Phil—Philadelphia

Motor:
Gn-El—General Electric
West—Westinghouse

Controller:
Gn-El—General Electric
West—Westinghouse

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks and Electric Commercial Cars Will be Found at the End of Gasoline Commercial Cars

See Also Replacement Table in "Service and Repair Departments." Truck Frame Dimensions Are Included in Replacement Table

(Where prices are not given they may be had on application to the manufacturer)

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
800 Pounds																															
Overland	1777	900	Own	3 3/8x5	18.2	L	T	C	B	Till	...	Con	L	C	Selec	3	....	Own	B	¾-Fl	.....	.....	S&C	31x4*	31x4*	Own	104	.....	.....	.....	63.8
Pony	800	320	Own	2¾x4	12.1	L	T	H	B	Strm	G	AtK	...	...	Fric	3	....	Dead	C	O	4.25:1	12.25:1	Tut	28x3	28x3	Own	92	.....	Pru	.....	60
1000 Pounds																															
Dodge	1975	1010	Own	3 7/8x4½	24.1	L	C	T	B	Stew	V	Own	N	D	Selec	3	U	Own	S	Flot	4.16:1	19.44:1	Det	33x4	33x4	Own	114	.....	Own	Own	41
Ellsworth 25A	2100	....	Lyco	3¼x5	16.9	L	T	T	S	Cart	G	Con	A	C	GLee	3	U	Stan	B	Gem	4.75:1	16:1	Shel	30x3½*	30x3½*	Fos	108	.....	Sal	Det	70
Indiana 12	3800	2150	Wau	3¾x5¼	22.5	L	C	T	F	Strm	G	Eis	...	B	Selec	3	A	Acme	W	½-Fl	7.8:1	28.4:1	S-El	34x3½	34x5	Wohl	134	Wau	Bim	.....	65
Vim 27	2120	1095	Own	3 x4½	14.4	L	T	McC	C	Zen	G	Atk	...	C	Selec	3	U	Spic	W	Shel	5.5:1	8.86:1	Shel	31x4*	31x4*	Jac	108	.....	Hoo	Fir	....
Vim 28	2250	1350	Own	3 x4½	14.4	L	T	McC	C	Zen	G	AtK	...	C	Selec	3	U	Spic	W	Shel	5.5:1	8.86:1	Shel	32x4½*	32x4½*	Jac	127	.....	Hoo	Fir	....
1200 Pounds																															
Overland	2179	....	Own	4 1/8x4½	27.2	L	T	C	B	Till	...	Con	L	C	Selec	3	....	Own	S	¾-Fl	.....	.....	S-El	33x4½*	33x4½*	Own	106	.....	.....	.....	68.8
1500 Pounds																															
Atlas 19	2320	1260	Lyco	3½x5	19.6	L	T	H	S	Sheb	...	AtK	R	B	Selec	3	....	Arv	B	Hess	.....	.....	Row	32x4*	32x4*	CAS	118	.....	.....	.....	60
Belmont	....	750	.....	3½x5	19.6	...	T	.....	...	.....	G	.....	...	D	Selec	..	U	.....	...	½-Fl	5.25:1	15.75:1	S-El	30x3½	30x3½	.....	110	.....	E&O	Fir	....
Diehl A	2400	1575	Cont	3½x5	19.6	...	T	H	B	Zen	G	Bos	...	B	Durst	3	....	K-B	I	Torb	5.33:1	3.5:1	Mar	34x4½*	35x5*	Jac	115	.....	Sch	Fir	90
Dispatch G	2200	1200	Wis	3¾x5	22.5	L	T	C	F	Rayf	...	Bos	U	O	Own	4	....	Bld	C	Dead	.....	.....	Tut	34x4*	34x4*	W	120	.....	.....	.....	50
G.M.C. 16	2940	1595	Cont	3¾x5	22.5	L	C	McC	S	Mar	G	Eis	...	D	Selec	3	U	UM	B	WM	6:1	21.9:1	Det	35x5*	35x5*	Jac	132	Mon	.....	Bak	67
International H	2800	1550	Own	3½x5¼	19.6	L	C	Own	B	Ens	G	Bos	O	D	Own	3	A	Own	I	Own	7:1	25:1	.....	36x3	36x3½	Ross	115	Own	Own	Fir	90
Old Hickory M	2100	995	Lyco	3¼x5	16.9	L	T	C	S	Cart	G	Cov	D	C	Selec	3	U	Own	B	½-Fl	6:1	18:1	.....	33x4*	33x4*	W	112	.....	Sal	Sta	60
Oldsmobile	2324	1250	Own	4¾x5¼	21.7	O	C	Own	B	Zen	V	AuL	L	C	Selec	3	U	Hart	I	Torb	6.5:1	38.87:1	S-El	35x5	35x5	W	128	.....	AuW	Jax	73
Rainier R11	2350	1750	Cont	3½x5	19.6	L	T	Har	...	Zen	V	Sim	...	D	B-Li	3	....	Hart	W	Timk	7.2:1	23.9:1	Per	34x4½	34x4½	Lav	125	Mon	Sch	Fir	80
Reo F	2525	1285	Own	4 1/8x4½	27.2	L	C	Own	S	John	G	Rem	R	O	Own	3	....	Own	B	Own	4.6:1	17.2:1	Penn	34x4½*	34x4½*	Own	128	....	Pru	Fir	62.5
Shaw M-2	....	1900	Cont	3¾x5	22.5	L	T	T	B	Zen	...	Bos	...	D	B-Li	3	....	Spic	G	Timk	.....	.....	Per	32x4*	32x4*	Gem	116	.....	.....	.....	65
Stewart 11	2400	1195	LeRoi	3 1/8x4½	15.6	L	T	C	B	Zen	...	Eis	...	B	Durst	3	U	Hart	I	Own	6:1	.....	Det	32x4	32x4	CAS	110	LRoi	Wan	Fir	66.7
Texan A38	2500	1340	Lyco	3½x5	19.6	L	T	H	B	Cart	G	Del	D	B	Munc	3	....	UP	B	Flot	.....	18.6:	Cant	33x4	33x4	CAS	112	.....	.....	.....	60
White 15	2960	2400	Own	3¾x5 1/8	22.5	L	C	C	B	Own	G	Mag	...	D	Selec	4	A	Own	B	Own	.....	.....	.....	34x4½*	34x4½*	Own	133	.....	.....	Fir	70
1 Ton																															
Acason R	3650	2100	Wau	3¾x5¼	22.5	L	P	Can	S	Sheb	G	Eis	...	F	Full	3	U	Bld	W	Timk	8.25:1	33:1	Det	36x3½	36x5	Ross	142	Wau	Bim	.....	73
Acme B	3376	2075	Cont	3¾x5	22.5	L	T	GO	B	Rayf	V	Eis	G	B	Cott	3	U	Bld	W	Timk	7.75:1	31:1	Det	34x3½	34x5	Ross	130	Dup	Bim	....	80
All-American A	2600	1295	H-Sp	3¼x5	16.9	L	T	Stan	B	Strm	G	Sim	...	B	GLee	3	...	UP	I	Torb	6:1	18:1	Det	33x4*	32x4	Ross	130	Pier	Stn	Gyd	75
Apex C	2870	1395	Buda	3 1/8x5 1/8	19.6	L	T	Can	P	Strm	V	AuL	Q	F	Full	3	U	UP	I	Torb	6.5:1	19.5:1	Det	33x4*	32x3½	Lav	130	....	.....	Fir	70
Beck-Hawkeye A	2800	1650	Cont	3¾x5	22.5	...	T	Har	S	Strm	G	Bos	...	F	Full	3	....	Bld	I	Cl	6:1	2.5:1	Hig	34x3½	34x5	Lav	124	Pier	Hay	Fir	75

Belmont A	2000	1150	GBS	3¾x4¼	22.5	L	T	GO	S	Zen	G	Con	D	P	Selec	3	U	Ster	B	¾-Fl	5.25:1	15.75:1	S-El	31x4	31x4	Lav	113	....	E&O	Stn	30
Bessemer G	2900	1600	Cont	3½x5	19.6	L	T	C	B	Zen	...	Bos	...	F	Full	3	....	Arv	I	Torb	......	......	Per	34x3½	34x4	Ross	124	....	....	....	57
Briscoe T34	....	....	Own	3⅜x5	18.2	L	T	C	B	Buic	G	Bat	L	C	Own	3	U	UM	I	Russ	8.2:1	23.4:1	S-El	33x4	34x3½	Lav	121	....	....	Jax	....
Cameron D	....	....	Own 6	2 13/16x4½	19.5	O	A	.....	B	Zen	...	.....	B	B	Selec	3	....	Ther	I	Torb	12:1	......	Bran	35x5*	35x5*		136	....	....	....	....
Chevrolet T	2840	1325	Own	3 11/16x5¼	21.7	O	C	Har	B	Zen	...	Rem	L	C	Warn	3	....	Arv	W	½-Fl	......	......	Hess	33x4*	35x4*	Warn	125	Mon	....	....	....
Chicago C-1	3100	2200	Her	3¾x5⅛	22.4	L	.	T	F	Strm	G	Bos	...	L	B-Li	3	U	Peters	W	Timk	7.75:1	25.8:1	Math	36x3	36x4	Gem	132	Simp	Q	Stn	....
Clydesdale 32X	3400	2185	Cont	3¾x5	22.5	L	T	T	S	Zen	G	Bos	...	L	B-Li	3	....	Spic	W	Stan	7.5:1	24:1	Stan	34x3½	34x5	Ross	144	Own	....	....	72
Collier 18	....	1650	Cont	......	19.6	...	..	.....	S	.....	...	.....	...	F	Full	..	....	......	W	Own	......	......	......	34x4	34x5	......	140	Mon	....	....	....
Columbia F	2800	1750	Cont	3¾x5	22.5	L	C	T	B	Shk	G	Dix	...	B	Covt	3	U	Spic	I	Russ	7.5:1	21:1	Per	34x3½	34x5	Own	125	Pier	StM	Fir	70
Commerce E	2900	1590	Cont	3¾x5	22.5	L	T	L	S	Zen	V	Eis	I	C	Selec	3	....	Spic	I	Torb	7:1	22.9:1	Det	35x5	35x5	Jac	126	....	Bim	Fir	80
Conestoga 20	3300	2100	Cont	3½x5	19.6	L	T	EM	S	Strm	G	Sim	...	F	Full	3	U	Ster	W	Wis	7.75:1	23:1	S-El	34x3½	34x5	Ross	128	....	E&O	Stn	90
Corbitt E	3250	2200	Cont	3¾x5	22.5	L	T	McC	B	Strm	V	Eis	...	D	B-Li	3	U	Hart	W	Shel	6.5:1	19.5:1	Shel	34x3½	34x4	Ross	130	Simp	Bim	Fir	75
Dart E	3200	2100	Buda	3¾x5⅛	22.5	L	T	C	S	Zen	V	Eis	...	F	Full	3	U	Arv	W	Timk	7:1	20.3:1	Per	34x3½	34x5	Ross	130	....	Pru	....	80
Day-Elder A	3000	1925	Cont	3½x5	19.6	L	T	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	7.75:1	28.3:1	Shel	34x3	34x4	Ross	128	....	Jon	Stn	70
Dearborn C	2100	1500	......	3¾x4¼	22.5	L	T	H	S	Strm	G	Dix	...	...	GLee	3	U	......	I	Torb	6.5:1	19.5:1	C-C	31x4*	35x5*	Dit	125	....	....	....	90
Denby 12	3100	1950	Cont	3½x5	19.6	L	T	L	B	Strm	G	Eis	...	F	Full	3	U	UP	I	Russ	8.2:1	26.2:1	Det	34x3	34x4	Ross	124	Mon	....	....	73
Douglas C	2750	1700	Buda	3½x5⅛	19.6	L	T	Own	B	Sheb	...	Eis	...	F	Full	3	....	Arv	I	Torb	......	......	Own	34x4½	35x5	Ross	122	....	....	....	65
Famous B-10	3000	1690	Cont	3½x5	19.6	L	T	T	S	Strm	V	Eis	...	F	Full	3	U	Bear	I	Cl	7:1	21:1	Det	36x3½	36x4	Ross	120	Mon	Bim	....	75
Federal SD	3600	2300	Cont	3¾x5	22.5	L	C	T	F	Zen	V	Eis	...	B	Own	3	A	Pet	W	Timk	6.2:1	20.6:1	Math	35x5*	36x6*	Gem	132	Phar	Det	Det	71
Ford T	1450	550	Own	3¾x4	22.5	L	T	T	S	Own	G	Mag	...	D	Plan	2	U	Own	W	½-Fl	7.25:1	......	......	30x3½*	32x4½*	......	124	....	Smi	....	....
Forschler A	3450	2100	Cont	3½x5	19.6	L	C	Own	B	Zen	...	Bos	Q	F	Full	3	....	Hart	W	Shel	......	......	Own	36x3	36x4	Ross	120	Dup	....	....	....
Gary F	3200	1900	Buda	3¾x5	22.5	...	C	T	F	Mas	G	Eis	...	F	Full	3	U	Bld	W	Timk	7.2:1	21.6:1	S-El	36x3½	36x4	Lav	130	Pier	Pru	Gdy	....
Giant 15	2950	1950	Cont	3¾x5	22.5	L	T	Idl	B	Sheb	G	Eis	...	L	B-Li	3	U	Spic	W	Shel	8.8:1	8.66:1	Math	34x3½	34x5	Jac	138	....	Wan	....	94
Higrade A18	2900	2100	Cont	3½x5	19.6	L	T	Per	B	Zen	...	Sim	E	F	Full	3	....	Bld	W	Shel	......	......	Per	35x5	35x5	Lav	115	Dup	....	....	66
Hoover 15B	2425	1625	Cont	3½x5	19.6	L	P	Can	F	Sheb	V	Dix	...	F	Full	3	U	Acme	W	Shel	6.2:1	18.6:1	Shel	32x4	33x4½	Lav	120	....	E&O	Fir	80
Indepen't B, Dav'n't, Ia.	2900	1550	Cont	3½x5	19.6	L	T	C	F	Strm	V	Bos	...	F	Full	3	U	Bld	C	Dead	8.2:1	......	GC	34x4½*	36x6*	Lav	132	....	Pru	Fir	75
Indepen't F, Y'ngst'n, O.	2850	1685	Cont	3½x5	19.6	L	T	C	B	Zen	...	Eis	...	F	Full	3	....	Ster	W	Stan	......	......	S-El	34x3	34x4	Wohl	128	....	....	....	70
International F	3000	1850	Own	3½x5¼	19.6	L	C	Own	B	Ens	G	Bos	O	D	Own	3	A	Own	I	Own	8:1	26.5:1	......	36x3½	36x4	Own	128	Own	Own	Fir	50
Jones 31A	3400	1495	Cont	3½x5	19.6	L	P	C	F	Strm	G	Eis	...	B	GLee	3	U	Arv	I	Russ	8.33:1	22.5:1	Cham	34x3½	34x4	CAS	130	Pier	Pru	Fir	80
Klieber AA	....	2400	Cont	3¾x5¼	22.5	...	..	.....	...	Strm	G	Bos	...	...	B-Li	..	A	......	W	......	7:1	23.52:1	......	34x3½	34x5	Ross	130	....	W&L	....	....
Menominee HT	....	2080	Cont	3¾x5	22.5	L	T	C	S	Strm	G	Eis	...	F	Selec	3	U	Spic	W	Timk	7:1	23.3:1	Tut	34x3½	34x5	Ross	130	Mon	Stn	Fir	80
Myers 60	2850	1545	Lyco	3½x5	19.6	L	T	C	B	Zen	G	Swi	...	D	MM	3	U	UM	W	Chic	7.5:1	30.:1	C-C	34x3½	34x4	CAS	130	....	E&O	....	75
Napoleon 9	3200	1385	Vict	3½x5	19.6	O	T	T	F	Strm	G	Con	L	F	Full	3	U	UP	I	Cl	6:1	18:1	......	35x5*	35x5*	Lav	133	....	....	Fir	65
Nash 2018	3400	1650	Own	3¾x5¼	22.5	L	C	T	F	Strm	G	Eis	...	B	Selec	3	U	Own	I	Celf	6.83:1	21.85:1	......	34x3	34x4	Jac	130	Simp	AuW	....	67.5
Nelson & LeMoon F1	2900	2250	Cont	4⅛x5¼	27.2	L	C	T	S	Strm	G	Bos	W	L	B-Li	3	U	Own	W	Timk	7:1	2:1	Tut	36x3½	36x5	Lav	...	Pier	Pru	Gdy	80
Noble A20	3200	....	Buda	3¾x5¼	22.5	...	C	T	...	Zen	G	Eis	...	F	Full	3	U	......	...	Shel	7.8:1	7.75:1	S-El	36x3½	36x4	Lav	148	Pier	Bim	....	....
Norwalk	1650	1595	Lyco	3½x5	22.5	L	T	C	S	Zen	...	Del	D	D	MM	3	....	UM	W	½-Fl	......	......	C-C	34x4*	34x4	CAS	130	....	....	....	90
Ogden A1	3400	2095	Cont	3¾x5	22.5	L	T	T	B	Rayf	G	Bos	...	B	B-Li	3	U	Acme	W	Timk	7.75:1	11.18:1	Tut	36x3	36x4	Gem	136	Pier	Stn	....	70
Old Hickory	3470	2175	Cont	3¾x5	22.5	L	T	T	F	Strm	V	Mag	...	B	Selec	3	U	Bld	W	½-Fl	7.75:1	23.1:1	S-El	36x3½	36x4	W	135	Pier	Stn	Fir	75
Piedmont O	....	....	Lyco	3½x5	19.6	L	T	Stan	F	Cart	...	Bat	D	B	Selec	3	....	Hart	W	Emp	......	......	S-El	33x4*	33x4	......	130	....	....	....	....
Pioneer B	....	1590	Cont	3½x5	19.6	...	T	.....	...	Strm	...	Bos	...	...	B-Li	3	....	......	W	Timk	......	......	......	36x3	36x4	......	132	....	....	....	....
Rainier R-9	2800	1875	Cont	3½x5	19.6	L	T	Har	B	Zen	...	Sim	...	D	B-Li	3	....	Hart	W	Shel	......	......	Per	32x3	32x4	Lav	125	Mon	....	....	80
Republic 10	2975	1595	Cont	3¾x5	22.5	L	T	C	B	Strm	G	Eis	...	D	Full	3	U	Arv	I	Torb	7:1	20.9:1	S-El	34x3	34x4	Jac	124	Rug	Pru	Fir	....
Royal	....	2400	Wis	3¼x5	16.9	...	C	T	...	Strm	...	Bos	Q	B	Own	3	....	Own	W	Timk	......	......	Mer	34x4	34x5	Ross	128	Mon	....	....	....
Sandow G	3000	1795	Cont	3 x5	19.6	L	T	T	B	Strm	G	Eis	...	D	Full	3	U	UM	W	Shel	7.8:1	23:1	GC	34x3½	34x5	Ross	120	....	Stn	....	70
Service 220	3470	2245	Buda	3½x5⅛	19.6	L	T	T	B	Strm	V	Eis	...	D	Selec	3	U	Arv	W	Timk	7.75:1	23.2:1	......	34x3½	24x5	Ross	137	....	Bim	....	64
Signal F	4395	2400	Cont	4⅛x5¼	27.2	L	C	McC	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	7.75:1	4:1	Det	34x3½	36x5	Ross	144	Pier	Hay	Gdy	80
Standard 56	3400	1900	Cont	3¾x5	22.5	L	C	T	B	Strm	G	Eis	D	...	B-Li	3	U	Spic	W	Timk	7.2:1	24:1	......	34x3½	34x4	Ross	134	Mon	....	....	75
Stewart 8	2820	1650	Cont	3½x5	19.6		T	T	B	Zen	G	Eis	...	B	Durst	3	U	Hart	I	Own	6.8:1	20.4:1	Det	34x3½	34x4	Gem	130	....	Wan	....	70
Superior D	....	1600	Cont	3¾x5	19.6	O	T	Idl	...	Strm	...	Eis	...	F	Full	3	....	Arv	I	Torb	......	......	Tut	34x4½*	34x4	Ross	124	Pier	Sch	Fir	....
Transport 20	3070	1650	Cont	3¾x5	22.5	L	T	C	B	Strm	G	Eis	...	F	Full	3	U	Ther	I	Cl	7.25:1	21.75:1	Det	34x3½	34x4	Jac	130	Simp	....	Fir	70
Vim 25	3350	2195	Her	3¾x5⅛	22.5	L	C	McC	C	Zen	G	Dix	...	D	Selec	3	U	Spic	W	Shel	6.5:1	9.83:1	Shel	35x5*	35x5*	Jac	125	....	Hoo	Fir	....
Wilson F	3150	1750	Cont	3½x5	19.6	L	T	H	B	Strm	G	Eis	...	D	Covt	3	U	Bld	W	Emp	6:1	18.1:1	Shel	35x5*	35x5*	Ross	124	Pier	....	....	75

1¼ Ton

1¼ Ton

Garford 25	3900	1890	Buda	3¾x5⅛	22.5	L	C	T	S	Strm	G	Spl	...	L	......	3	....	Spic	W	Stan	7.5:1	24:1	Stan	34x3½	34x5	Ross	144	Own	....	....	72
Kissel Delivery	2950	1875	Own	3⅞x5½	24.1	L	C	McC	S	Strm	V	Eis	...	W	Warn	3	U	Spic	B	Own	5:1	18.3:1	Math	34x4½*	34x4½*	Jac	135	Pier	Pru	Fir	80
Koehler C	3300	1785	H-Sp	3½x5	19.6	L	T	T	P	Zen	G	Eis	...	O	MM	3	U	Spic	I	Torb	7:1	15:1	Math	34x3	34x5	Own	132	Simp	Wan	SAE	65
Oneida A9	....	1985	Own	3¾x5	22.5	L	C	.....	P	.....	...	Mag	...	...	Own	3	....	......	...	......	......	......	S-El	36x3½	36x5	......	135	....	....	....	....
Triangle AA	2500	....	Her	3¼x5	16.9	L	T	Per	B	Strm	...	.....	...	B	......	3	....	UP	I	Cl	......	......	Det	35x5	35x5*	Gem	115	....	....	....	....

1½ Ton

1½ Ton

Acason RB	3850	2300	Wau	3¾x5¼	22.5	L	P	Can	S	Sheb	G	Eis	...	F	Full	3	U	Bld	W	Timk	9.25:1	37:1	Det	36x3½	36x6	Ross	142	Wau	Bim	....	77
Ace	4000	....	Buda	3¾x5⅛	22.5	L	T	Spi	F	Sheb	G	AtK	W	M	Cott	3	....	Hart	I	Torb	......	......	Det	34x4	34x6	Ross	144	....	....	....	80
Acme F	....	2275	Cont	3¾x5	22.5	L	T	GO..	B	Rayf	V	Eis	G	B	Cott	3	U	Bld	W	Timk	8.75:1	35:1	Det	34x3½	34x5	Ross	141	Dup	Bim	....	80
Apex D	3070	1595	Buda	3½x5⅛	19.6	L	T	Can	P	Strm	V	AuL	Q	F	Full	3	U	UP	I	Torb	8:1	24:1	Det	32x3½	32x4	Lav	130	....	....	Fir	70
Atterbury 7R	4770	2575	Cont	4⅛x5¼	27.2	L	C	T	S	Zen	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	8.5:1	34:1	SP	36x3½	36x5	Gem	140	Mon	Arc	Fir	96.5
Beck-Hawkeye B	3200	1950	Cont	3¾x5	22.5	...	T	H	S	Strm	G	Bos	...	F	Full	3	U	Bld	I	Cl	6:1	2.5:1	Hig	34x3½	36x6	Lav	144	Pier	....	....	75
Belmont B	3200	1950	Buda	4 x5½	25.6	L	P	GO	P	Zen	V	Eis	...	D	Selec	3	U	Ster	I	Russ	7.7:1	23:1	S-El	34x4½	34x5	Lav	139	Pier	E&O	Stn	75
Bessemer H2	3650	2085	Cont	3¾x5	22.5	L	T	C	B	Zen	...	Bos	...	B	B-Li	3	....	Arv	I	Torb	......	......	Ter	36x3½	36x5	Ross	144	....	....	....	63
Bethlehem D	3300	1965	Own	3¾x4½	22.5	L	T	Fed	B	Sheb	G	Bat	G	B	Det	3	U	UP	I	Russ	8.2:1	26.2:1	Shel	34x3½	34x5	Lav	136	Mon	Nan	Fir	85
Brinton D	....	....	Cont	4⅛x5¼	27.2	...	C	T	S	Strm	..	Bos	...	L	B-Li	..	....	......	W	Timk	......	......	S-El	34x4	34x5	......	138	....	....	....	....
Brockway S2	3550	2100	Cont	3¾x5	22.5	L	T	Bus	B	Strm	V	Eis	...	L	B-Li	3	U	Spic	W	Shel	7.8:1	26:1	Mer	36x3½	35x5	Gem	140	Opt	Hoo	....	70
Chicago C1½	3800	2600	Her	3¾x5⅛	22.4	L	..	T	F	Strm	G	Bos	...	L	B-Li	3	U	Peters	W	Timk	7.25:1	25.8:1	Math	36x3½	36x5	Gem	144	Simp	Q	Stn	....
Clydesdale 42	3750	2445	Cont	3¾x5	22.5	L	T	T	S	Zen	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	7:1	23:1	Stan	36x3½	36x6	Ross	146	Own	....	....	72
Collier 19	4000	1850	Cont	......	22.5	...	..	.....	...	.....	...	.....	...	...	......	..	....	......	...	Own	......	......	......	36x4	36x6	......	144	....	....	....	....
Comet 1½	2898	1750	Lyco	3½x5	19.6	L	T	Stan	B	Cart	G	Del	D	B	Munc	3	U	UP	W	Stan	......	......	Mar	34x4*	34x4	CAS	130	....	....	Fir	85
Commerce EP	3200	1965	Cont	3¾x5	22.5	L	T	L	S	Zen	V	Eis	I	C	Selec	3	U	Spic	I	Torb	7:1	22.9:1	Det	36x6*	36x6*	Jac	134	....	Bim	Fir	80
Concord A	4200	2700	Buda	3¾x5½	22.5	L	C	T	S	Zen	...	Eis	...	L	B-Li	3	....	Spic	W	Timk	......	......	Per	36x3½	36x5	Ross	140	Mon	....	....	70
Corbitt D	3960	2600	Cont	3¾x5	22.5	L	T	McC	B	Strm	V	Eis	D	...	B-Li	3	U	Hart	W	Shel	8.66:1	26:1	Shel	36x3½	36x5	Ross	140	Simp	Bim	Fir	75
Day-Elder B	3300	2200	Cont	3¾x5	22.5	L	T	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	9.33:1	34.1:1	Shel	34x3½	34x5	Ross	144	....	Jon	Stn	72
Dearborn F	3280	1980	Cont	3½x5	19.6	L	T	T	S	Strm	V	Bos	...	F	Full	3	U	Arv	W	Stan	7.75:1	23.25:1	Tut	34x4	34x5	Lav	126	....	....	....	80

1½ Ton—Continued

1½ Ton—Continued

Model	Chasis Weight	Chasis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
Defiance B.	3200	1795	Cont	3¾x5	22.5	L	T	Per	B	Strm	...	Eis	...	B	GLee	3	....	Arv	I	Torb	.....	.....	Det	34x3½	34x5	Dit	135	Mon	.....	.....	85
Diamond T-Farm Spec.-T.	5100	2295	.....	3¾x5¼	22.5	L	C	T	B	Strm	G	Bos	...	...	Selec	3	U	Ther	W	Timk	7.75:1	26.04:1	Math	36x3½	36x5	.....	144	.....	.....	.....	....
Diamond T-J4.	3925	2755	.....	3¾x5	22.5	L	C	T	B	Strm	G	Bos	...	...	.....	3	U	Spic	W	.....	7.75:1	25.8:1	Math	36x3½	36x5	.....	154	Pier	.....	.....	....
Douglas D.	3100	2100	Buda	4⅛x5½	27.2	L	C	Own	B	Sheb	...	Eis	...	F	Full	3	....	Arv	I	Torb	.....	.....	Own	34x3½	34x5	Ross	127	Pier	.....	.....	65
Erie 1½	4700	....	Buda	3¾x5	22.5	L	C	McC	B	Strm	V	Bos	...	D	Full	4	....	Sher	W	Shel	.....	.....	Per	34x3½	36x5	Ross	144	Pier	.....	.....	80
Fageol 1½	3500	....	Lyco	3½x5	19.6	L	C	Spi	S	Till	...	Dix	...	B	Selec	5	....	Spic	W	Stan	5.63:1	59.7:1	Math	34x3½	34x6	Ross	136	.....	Pru	.....	80
Famous B-12.	3600	2095	Cont	3¾x5	22.5	L	C	T	S	Strm	V	Eis	...	F	Full	3	U	Bear	I	Cl	7:1	21:1	Det	36x3½	36x5	Ross	138	Mon	Bim	.....	75
Federal TE.	4450	2500	Cont	4⅛x5¼	27.2	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	8.5:1	37.4:1	Math	36x3½	36x5	Gem	144	Phar	Sch	Fir	68.5
Forschler A-X.	3670	2375	Cont	3½x5	19.6	L	C	Own	B	Zen	...	Bos	Q	F	Full	3	....	Hart	W	Shel	.....	.....	Own	36x3½	36x6	Ross	120	Dup	Smi	.....	....
Fulton C.	3300	2350	H-Sp	3¼x5	16.9	L	C	GO	B	Cart	C	Sim	...	B	Durst	3	....	UP	I	Russ	.....	.....	S-El	34x4	34x6	Lav	137	.....	.....	.....	68
Gary GT.	3800	2250	Buda	4 x5½	25.6	...	C	T	F	Mas	G	Eis	...	F	Full	3	U	Bld	W	Timk	7.25:1	21.75:1	S-El	36x3½	36x5	Ross	142	Pier	Pru	Gdy	....
Gersix M.	4300	2650	Buda	4 x5½	25.6	L	C	I	F	Strm	V	Bos	...	B	Cott	3	U	Bld	W	Own	7.75:1	31:1	Tut	36x3½	36x6	Ross	142	Mon	Jon	.....	70
Giant 14.	3600	2250	Cont	3¾x5	22.5	L	C	Idl	B	Sheb	G	Eis	...	L	B-Li	3	U	Spic	W	Shel	7.8:1	25.97:1	Math	34x3½	34x5	Jac	144	Pier	Wan	.....	94
G.M.C. 31A.	4205	2500	Cont	3¾x5	22.5	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x3½†	36x5	Jac	130	Mon	.....	SAE	74
G.M.C. 31B.	4245	2500	Cont	3¾x5	22.5	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x3½†	36x5	Jac	144	Mon	.....	SAE	74
Gramm-Bernstein 15.	3800	1995	Cont	3¾x5	22.5	L	T	T	S	Strm	G	NE	...	D	Selec	3	U	Own	I	Cl	7.22:1	21.6:1	.....	36x3½	36x5	Ross	138	.....	.....	Fir	90.5
Gramm-B'rst'n 15-Worm.	4200	2500	Cont	3¾x5	22.5	L	T	T	S	Strm	G	NE	...	D	Own	3	A	Own	W	Stan	7.22:1	26:1	.....	36x3½	36x5	Ross	138	.....	.....	Fir	90.5
Grant 10.	3000	1885	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	7:1	.....	Per	34x4½*	34x5	Jac	124	.....	Bim	Fir	65
Grant 11.	3100	1935	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	7:1	.....	Per	34x4½*	34x5	Jac	140	Pier	Bim	Fir	67
Hahn CD	4200	....	.....	4½x5	27.2	L	C	Own	F	Strm	...	Bos	...	D	B-Li	3	...	Spic	W	Timk	.....	.....	.....	36x3½	36x5	Ross	130	Pier	.....	.....	65
Harvey WEA.	3850	2350	Buda	4½x5½	27.2	L	P	C	F	Zen	G	Bos	...	F	Full	3	U	Arv	W	Shel	7.75:1	23.25:1	Shel	34x3½	34x5	Ross	128	Mon	StM	.....	60
Hawkeye K.	3400	1995	Buda	3¾x5½	22.5	L	C	C	F	Zen	...	Eis	...	F	Full	3	...	Hart	I	Cl	.....	.....	Det	34x3½	34x5	Ross	148	Simp	.....	.....	70
Huffman B.	3200	1895	Cont	3¾x5	22.5	...	C	C	F	Zen	G	Dix	I	F	Full	3	U	.....	W	Stan	8.67:1	8:1	Per	34x3½	34x5	Lav	140	.....	Roy	Fir	85
Huffman C.	3350	1695	Cont	3¾x5	22.5	...	C	C	F	Zen	G	Dix	I	F	Full	3	U	.....	W	Torb	12.17:1	11.50:1	Per	34x3½	34x5	Lav	140	.....	Roy	Fir	85
Hurlburt.	4300	2850	Buda	4 x5½	25.6	L	C	C	S	Flch	G	Eis	...	D	B-Li	3	U	Spec	W	Flot	7.75:1	31:1	Per	34x4	34x5	Ross	148	Dup	Wan	.....	....
Indepen't E, Dav'n't, Ia.	3550	1890	Cont	3¾x5	22.5	L	C	C	B	Strm	V	Bos	...	F	Full	3	U	Bld	C	Dead	8.2:1	.....	GC	35x5*	38x7*	Lav	135	.....	Pru	Fir	75
Indiana 20.	4800	2750	Rut	4⅛x5½	27.2	L	C	T	F	Strm	G	Eis	...	B	Selec	4	A	Acme	W	½-Fl	7.75:1	31:1	S-El	36x4	36x7	Wohl	150	Pier	Bim	.....	68.5
International K.	3400	2200	Own	3½x5¼	19.6	L	C	Own	B	Ens	G	Bos	O	D	Own	3	A	Own	I	Own	41:1	30:1	.....	36x3½	36x5	Own	128	Own	Own	Fir	90
Kalamazoo G.	4450	2600	Cont	3¾x5	22.5	L	C	Hvn	B	Strm	V	Con	D	F	Full	4	A	Acme	W	Wis	8.5:1	41:1	Shel	34x4	34x5	Ross	144	Pier	Bim	.....	....
Kelly-Springfield K31.	4590	3000	Own	3¾x5¼	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Own	C	Dead	8.66:1	31.58:1	Per	36x3½	36x6	Gem	144	Pier	StM	.....	89
Kelly-Springfield K32.	4685	3000	Own	3¾x5¼	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Spic	W	½-Fl	8.66:1	31.58:1	Per	36x3½	36x6	Gem	144	Pier	StM	.....	89
Kimball A.	.....	.....	Wis	4 x6	25.6	L	C	Flex	B	Mas	V	Bos	...	L	B-Li	4	A	Spic	W	Shel	6.5:1	26:1	US	36x3½	36x5	Lav	126	Dup	Wes	.....	80
Kissel Utility.	3890	2275	Own	3⅞x5½	24.1	L	C	McC	S	Strm	V	Eis	...	W	Warn	3	U	Spic	W	Shel	7.8:1	28.5:1	Math	36x3½	36x5	Jac	152	Pier	Pru	.....	80
Kleiber A.	.....	2800	Cont	4⅛x5¼	27.2	...	C	.....	...	Strm	G	Bos	...	...	B-Li	..	A	.....	W	.....	7:1	28.1	.....	36x3½	36x6	Ross	143	.....	W&L	.....	....
Larrabee-Deyo U.	3600	2250	Cont	3¾x5	22.5	L	C	Bus	S	Sheb	G	Bos	...	L	B-Li	3	A	M	W	Shel	7.66:1	25.5:1	Mer	34x3½	34x5	Ross	138	Pier	Hoo	.....	....
Maccar L.	4300	2750	Cont	4⅛x5¼	27.2	L	C	Own	B	Strm	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	7:1	23.52:1	Mer	36x4	36x5	Ross	150	Pier	Sch	Gdy	70
Mack AB-1½.	4800	3000	Own	4 x5	25.6	L	C	Own	S	Zen	G	Dix	E	L	B-Li	4	U	Bld	C	Dead	6.99:1	28.01:1	Mer	36x4	36x3½†	Gem	144	Own	Sch	.....	68
Mack AB Worm.	4900	3000	Own	4 x5	25.6	L	C	Own	S	Zen	G	Dix	E	L	B-Li	4	U	Spic	W	Timk	8.50:1	34.09:1	Mer	36x4	36x3½†	Gem	144	Own	Sch	.....	68
Master Junior JW.	3800	2290	Buda	4⅛x5½	27.2	L	C	T	S	Mas	G	Eis	...	D	Full	3	U	Arv	W	Timk	7.75:1	23.25:1	Det	34x3½	34x5	Ross	142	McC	Pru	.....	78
Master Junior JI.	3900	2190	Buda	4⅛x5½	27.2	L	C	T	S	Mas	G	Eis	...	D	Full	3	U	Arv	I	Torb	8:1	24:1	Det	34x3½	34x5	Ross	142	McC	Pru	.....	78
Maxwell.	2385	1185	Own	3⅝x4½	21	...	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	32x3	32x4	Own	124	.....	Kel	Fir	50
Maxwell.	2385	1205	Own	3⅝x4½	21	...	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	32x3	32x4	Own	124	.....	Kel	Fir	50
Maxwell.	2385	1225	Own	3⅝x4¼	21	...	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	34x4½*	34x4½*	Own	124	.....	Kel	Fir	50
Maxwell.	2385	1287	Own	3⅝x4½	21	...	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	34x4½*	34x5	Own	124	.....	Kel	Fir	50
Maxwell.	2385	1350	Own	3⅝x4½	21	...	L	T	T	B	John	G	AtK	...	C	Selec	3	U	Own	W	½-Fl	7.25:1	34.4:1	Shel	35x5	35x5	Own	124	.....	Kel	Fir	50
Menominee H.	....	2725	Cont	3¾x5¼	22.5	L	C	C	S	Strm	G	Eis	...	F	Selec	3	U	Spic	W	Timk	9.25:1	23.3:1	Tut	36x3½	36x5	Ross	144	Mon	Stn	Fir	80
Moreland 19B.	4150	2930	Cont	4⅛x5¼	27.2	L	C	C	F	Mill	G	Dix	...	D	Selec	4	A	Ther	W	Timk	7:1	33.88:1	US	36x3½	36x5	Ross	126	.....	Smi	SAE	....
Myers 80.	3000	1875	Lyco	3½x5	19.6	L	C	T	S	Zen	G	Swi	...	B	GLee	3	U	UM	W	Chic	8.5:1	32:1	C-C	34x3½	34x5	CAS	144	.....	E&O	.....	75
Napoleon 11.	3450	1660	Vict	3½x5	19.6	O	C	T	F	Strm	G	Con	L	F	Full	3	U	UP	I	Cl	8:1	24:1	S-El	35x5*	36x6*	Lav	133	.....	.....	Fir	65
Nelson & LeMoon F1½.	3400	2425	Cont	4⅛x5¼	27.2	L	C	C	S	Strm	G	Bos	W	L	B-Li	3	U	Own	W	Timk	7:1	2:1	Tut	36x3½	36x6	Lav	...	Pier	Pru	Gdy	80
Noble B-30	4200	....	Buda	3¾x5¼	22.5	...	C	T	...	Strm	G	Eis	...	F	Full	3	U	.....	...	Shel	7.75:1	.....	S-El	36x3½	36x5	Lav	156	Pier	Bim	Q	....
Norwalk.	1850	1925	Lyco	3½x5	19.6	L	C	C	B	Zen	...	Del	...	B	GLee	3	....	UM	W	Stan	.....	.....	C-C	34x3½	34x5	CAS	130	.....	.....	.....	75
O.K. 1½ T.	3850	2450	Rut	4⅛x5½	27.2	L	C	T	B	Cart	...	Dix	...	D	Selec	3	....	Hart	W	Stan	.....	.....	Tut	36x4	36x5	Ross	146	Pier	.....	.....	....
Old Reliable A.	4150	2350	Wis	4 x5	25.6	L	C	T	B	Strm	V	Bos	Q	M	B-Li	3	U	Spic	W	Shel	7.75:1	26:1	Shel	34x3½	36x6	Ross	138	Pier	StM	.....	90
Oneida B9.	....	2385	Own	4	25.6	L	C	C	P	.....	...	Mag	...	...	Own	3	.....	.....	...	.....	.....	.....	S-El	36x3½	36x6	.....	144	.....	.....	.....	....
Packard 1½E.	4670	3200	Own	4 x5½	25.6	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	6.25:1	28.7:1	.....	34x3½	34x3½†	Own	144	Own	.....	.....	46.2
Patriot Lincoln.	3400	2150	Cont	3¾x5	22.5	L	T	Own	B	Strm	V	Bos	...	D	Selec	3	A	Ther	I	.....	7.7:1	27.9:1	S-El	34x3½	34x5	W	135	Pier	.....	Gdy	75
Piedmont.	....	....	Lyco	3½x5	19.6	L	T	Stan	F	Cart	...	Bat	D	B	Selec	3	....	Hart	W	Emp	.....	.....	S-El	.....	.....	.....	140	.....	.....	.....	....
Pioneer N.	....	1990	Cont	3¾x5	22.5	...	C	.....	...	Strm	...	Bos	...	...	B-Li	3	...	.....	W	Timk	.....	.....	.....	36x3½	36x5	.....	154	.....	.....	.....	....
Rainier R-6.	3100	1975	Cont	3½x5	19.6	L	T	Har	B	Zen	V	Sim	...	D	B-Li	3	U	Hart	W	Shel	7.8:1	25.97:1	Per	34x3	34x4	Lav	133	Mon	Sch	.....	80
Reliance 10.	4500	2500	Buda	4⅛x5½	27.2	L	C	H	B	Strm	G	Bos	...	F	Full	3	U	Hart	E	Badg	7.2:1	21.6:1	Shel	36x3½	36x5	Ross	150	Pier	Bim	Gdy	90
Republic 11X.	3365	1885	Cont	3¾x5	22.5	L	C	C	B	Strm	G	Eis	...	D	Full	3	U	Arv	I	Torb	8:1	23:1	S-El	34x3½	34x5	Jac	144	Rug	Pru	Fir	....
Royal.	....	2800	Wis	3¾x5	22.5	...	C	T	...	Strm	...	Bos	Q	D	Own	...	...	Own	W	Timk	.....	.....	Mer	34x4	34x5	Ross	128	.....	.....	.....	67
Sandow CG.	3300	2090	Cont	3½x5	19.6	L	T	T	B	Strm	G	Eis	...	D	Full	3	U	UM	W	Shel	7.8:1	23:1	GC	34x3½	34x5	Ross	135	.....	Stn	.....	70
Schwartz.	3500	2175	Cont	3¾x5	22.5	L	T	Fed	B	Strm	G	Bos	...	L	B-Li	3	....	Hart	I	Torb	.....	.....	Row	34x3½	34x5	Ross	140	Pier	.....	.....	....
Schwartz B.	3500	2375	Cont	3¾x5	22.5	L	T	Fed	B	Strm	G	Bos	...	L	B-Li	3	U	Hart	I	Torb	7.6:1	25.5:1	Row	36x6*	36x6*	Ross	140	Pier	Sch	.....	....
Selden 1½A.	3400	2240	Cont	3¾x5	22.5	L	T	Bus	B	Strm	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	7.75:1	.....	Per	34x3½	34x5	Lav	140	Pier	Arc	Gdy	70
Service 31.	4850	2785	Buda	4 x5½	25.6	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	7.75:1	37.5:1	.....	36x3½	36x6	Ross	150	Simp	Bim	.....	65
Service 36.	4900	3215	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	6.8:1	32.9:1	.....	35x5*	38x7*	Ross	150	Simp	Bim	.....	65
Signal H.	4675	2700	Cont	4⅛x5¼	27.2	L	C	C	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	9.25:1	4:1	Det	34x4	36x6	Ross	144	Pier	Hay	Gdy	80
Sterling 1½	4720	2480	Ster	4 x5¾	25.6	L	C	Own	C	Rayf	V	Eis	...	L	B-Li	4	U	Spic	W	Timk	7:1	28:1	Math	36x3½	36x5	Ross	142	Wau	Wan	.....	91
Stewart 9.	3440	1975	Cont	3¾x5	22.5	L	T	T	B	Zen	G	Eis	...	F	Full	3	U	Hart	I	.....	7.6:1	22.8:1	Det	34x3½	34x4†	Gem	140	.....	Wan	Fir	70

Stoughton B.	....	....	.....	3¾x5¼	22.5	...	C	Own	C	Strm	G	Eis	...	D	B-Li	3	U	.....	W	Shel	7.8:1	.....	S-El	36x3½	36x5	.....	140	.....	Own	Gdy	....
Sullivan F.	3500	2350	Buda	3¾x4½	22.5	L	T	V	F	Strm	G	Bos	...	H	Covt	3	A	Hart	W	Timk	8.50:1	31:1	Mer	36x3½	36x5	Ross	129	.....	Wan	.....	60
Texan TK39.	3200	1425	Lyco	3½x5	19.6	L	T	H	B	Cart	G	Del	D	B	Munc	3	U	UP	W	½-Fl	7.75:1	20.15:1	S-El	34x4	34x4	CAS	130	.....	.....	Fir	60
Tiffin GW.	3750	2300	Cont	4½x5¼	27.2	L	C	V	B	Sheb	G	Bos	...	F	Full	3	U	Hart	W	Shel	7.75:1	23.25:1	Kal	36x3½	36x5	Ross	129	Pier	Smi	.....	....
Towers J1½.	3400	2600	Cont	4½x5¼	27.2	L	C	T	S	Strm	...	Bos	...	F	Full	3	....	Spic	W	Timk	.....	.....	Det	35x5*	38x7*	Ross	142	Pier	.....	.....	70
Transport 30.	3450	2050	Cont	3¾x5	22.5	L	C	T	B	Strm	G	Eis	...	F	Full	3	U	Hart	I	Cl	7.6:1	22.8:1	Det	36x3½	36x5	Jac	140	Simp	.....	Fir	70
Triangle A.	3750	2185	Wau	3¾x5¼	22.5	L	C	Per	L	Strm	G	Eis	...	F	Full	3	U	UP	I	Cl	6.83:1	23:1	Det	34x3½	34x6	Gem	144	Wau	Roy	Fir	60
Triumph 1½.	4500	2350	Buda	3¾x5⅛	22.5	..	C	H	S	Strm	V	Dix	...	B	Cott	3	U	Hart	...	Russ	.....	8:1	S-El	36x3½	36x6	Lav	144	Pier	Stn	Stn	78
United A.	....	2100	Buda	3¾x5½	22.5	L	V	S	.....	G	Eis	Q	L	B-Li	3	U	Bld	I	Cl	7:1	.....	.....	34x3½	34x5	Ross	Q	Simp	Pru	Fir	80
U.S.N.	3800	2150	Cont	3¾x5	22.5	R	C	T	S	Strm	V	Eis	Q	D	B-Li	3	U	Opt	I	Cel	7.6:1	25.3:1	Shel	36x3½	36x5	Lav	144	Mon	Sch	.....	80
Velie 46.	3650	1925	Cont	3¾x5	22.5	L	C	T	B	Strm	G	Bcs	...	B	Durst	3	U	Arv	I	Torb	8:1	31.2:1	Math	36x3½	36x5	Gem	133	Mon	Bim	Gdy	80
White Hickory H.	3975	2475	Cont	3¾x5	22.5	L	C	T	B	Strm	V	Eis	...	F	Full	3	U	Arv	W	Timk	8.5:1	25.5:1	Shel	36x3½	36x5	Ross	144	Simp	Bim	Fir	76
Wichita L.	3600	2350	Own	3½x5	19.6	L	T	Per	S	Strm	G	Bcs	...	C	Covt	3	A	Own	W	Shel	7.75:1	3.65:1	.....	36x3½	36x5	Ross	144	.....	Bim	Fir	....
Winther 39.	3700	2150	Wis	3¾x5	22.5	L	P	T	G	Strm	G	Eis	B	F	Full	3	U	Arv	I	Cl	7:1	21:1	Har	34x3½	34x5	Lav	140	Own	.....	Fir	70
Winther 430.	4100	2375	Wis	3¾x5	22.5	L	P	T	G	Strm	G	Eis	...	F	Full	3	U	Arv	I	Cl	9:1	36:1	Har	32x4	32x4	Lav	132	Own	.....	Fir	70
Witt-Will W-DT19.	3550	2000	Cont	3¾x5¼	22.5	L	P	C	B	Zen	G	Eis	...	D	Selec	3	U	Spic	W	Timk	6:1	25:1	S-El	36x3	36x4	Ross	120	Pier	Arc	SAE	67
Wolverine C.	3400	2250	Cont	3¾x5	22.5	L	T	L	B	Strm	G	Mag	G	F	Selec	3	U	UP	I	Russ	8.2:1	32.8:1	Tut	34x3½	34x5	Gem	140	Mon	Hay	Gdy	77

2 Ton

2 Ton

Acme A.	4450	2875	Cont	4⅛x5¼	27.2	L	C	GO	B	Rayf	V	Eis	...	B	Cott	3	U	Bld	W	Timk	8.5:1	34:1	Det	36x4	36x7	Ross	148	Dup	Bim	.....	80
All-American B.	....	....	H-Sp	3½x5	19.6	L	T	Stan	B	Strm	...	Sim	...	F	Full	3	....	Hart	I	Torb	.....	.....	Det	34x4	34x6	Lav	144	.....	.....	.....	80
Armleder HW.	4550	....	Cont	4⅛x5¼	27.2	L	C	T	F	Zen	G	Bos	...	D	B-Li	3	U	Opt	W	Timk	8.5:1	34:1	Math	36x4	36x7	Ross	Q	Mon	StM	.....	80
Autocar F.	3430	2300	Own 2	4¾x4½	18	L	C	V	S	Strm	G	Mag	...	D	Prog	3	A	.....	R	Flot	8.3:1	33.2:1	.....	34x4	34x5	Own	97	.....	Hoo	.....	65
Autocar G.	3690	2400	Own 2	4¾x4½	18	L	C	V	S	Strm	G	Mag	...	D	Prog	3	A	.....	R	Flot	8.3:1	33.2:1	.....	34x4	34x5	Own	120	.....	Hoo	.....	65
Available H2.	4700	....	Cont	4⅛x5¼	27.2	L	C	T	B	Strm	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	7.75:1	31:1	Tut	36x4	36x7	Ross	152	Pier	Sch	.....	75
Beck Hawkeye C.	4000	2350	Cont	4⅛x5¼	27.2	...	P	H	F	Strm	G	Bos	...	F	Full	3	U	Bld	I	Cl	9:1	2:1	Hig	36x4	36x7	Lav	144	Pier	Hay	Fir	70
Belmont C.	4300	2550	Buda	4¼x5½	28.9	L	P	GO	P	Zen	V	Eis	...	D	Selec	3	U	Ster	I	Russ	8:1	22:1	S-El	36x4	36x7	Lav	150	Pier	E&O	Stn	75
Collier 20.	....	2150	.....	.....	22.5	...	...	.....	B	.....	...	.....	...	...	.....	..	...	.....	W	Own	.....	.....	.....	.....	.....	.....	152	.....	.....	.....	....
Columbia E.	4100	2350	Cont	4⅛x5¼	27.2	L	C	T	F	Shk	G	Dix	...	C	Covt	3	A	Spic	I	Russ	9.50:1	34.5:1	Per	36x4	36x6	Own	144	Pier	StM	Fir	80
Conestoga 30.	4000	2700	Cont	3¾x5	22.5	L	C	EM	S	Strm	G	Sim	...	F	Full	3	U	Ster	W	Wis	9.66:1	29:1	S-El	36x4	36x4†	Ross	138	.....	E&O	Stn	80
Corbitt C.	4800	3250	Cont	4⅛x5¼	27.2	L	C	McC	B	Strm	V	Eis	...	D	B-Li	3	U	Hart	W	Shel	8.75:1	29.4:1	Shel	36x3½	36x7	Ross	148	Simp	Bim	Fir	75
Day-Elder D.	3650	2600	Cont	4⅛x5¼	27.2	L	P	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	9.67:1	35 4:1	Shel	36x4	36x6	Ross	144	Mon	Jon	Stn	72
Dearborn BW.	3000	2250	Buda	3⅝x5⅛	19.6	L	T	H	S	Strm	V	Bos	...	B	GLee	3	U	Arv	W	Stan	7.75:1	23.8:1	S-El	32x4*	34x5	Dit	133	.....	.....	.....	90
Defiance C.	3500	1995	Cont	3¾x5	22.5	L	T	Per	B	Strm	...	Eis	...	B	GLee	3	....	Arv	I	Torb	.....	.....	Det	34x3½	34x6	Dit	135	Mon	.....	.....	85
De Kalb E2.	4150	2100	Cont	4⅛x5¼	27.2	L	P	T	F	Mas	G	Eis	...	F	Full	3	U	K-B	W	Timk	8.5:1	28:1	Math	34x3½	34x6	Ross	146	.....	Hay	.....	68
Denby 134.	3800	2450	Cont	3¾x5	22.5	L	T	L	S	Strm	G	Eis	...	F	Full	4	U	UP	I	Russ	10.2:1	49:1	Det	36x3½	36x6	Gem	144	Mon	.....	.....	75.5
Diamond T-J3.	4335	3185	.....	4⅛x5¼	27.2	L	C	T	B	Strm	G	Bos	...	...	.....	3	U	Spic	W	.....	7.75:1	26.04:1	Math	36x4	36x7	.....	154	Pier	.....	.....	....
Dorris K-4.	5200	3285	Own	4¼x5½	28.9	O	C	W	T	Strm	G	Bos	...	D	Warn	4	A	Spic	W	Timk	7.75:1	38.67:1	Row	36x4	36x7	Ross	162	Own	Bim	.....	70
Erie 2.	5100	....	Buda	4¼x5½	28.9	L	C	McC	B	Strm	...	Bos	...	D	Full	4	....	Spic	W	Shel	.....	.....	Per	34x3½	36x5	Ross	150	Pier	.....	.....	80
Fargo P.	3900	2200	Cont	3¾x5	22.5	L	T	Own	S	Rayf	G	Bos	...	D	Full	4	U	Spic	I	Russ	9.5:1	.....	Shel	36x4	36x6	Jac	144	.....	.....	.....	80
Federal UE.	4900	2800	Cont	4⅛x5¼	27.2	L	C	T	B	Zen	G	Eis	...	D	Own	4	A	Spic	W	Timk	9.25:1	40.7:1	Math	36x4	36x7	Gem	156	Phar	Sch	Fir	71.5
Forschler B.	4425	2750	Cont	4⅛x5¼	27.2	L	C	O	B	Zen	...	Bos	Q	F	Full	3	....	Hart	W	Shel	.....	.....	Own	36x4	36x7	Ross	137	Dup	Smi	.....	....
Gabriel E.	5000	3250	Buda	4¼x5½	28.9	L	C	T	F	Ray.	G	Bos	L	B	B-Li	4	A	Spic	W	Timk	8.5:1	1:1	Mer	35x5	36x7	Gem	156	Dup	Smi	Fir	65
Garford 70B.	4350	2990	Buda	4¼x5½	28.9	L	C	T	S	Rayf	G	Spl	...	L	Selec	4	A	Spic	W	Timk	1:1	4.84:1	Per	36x4	36x7	Ross	144	Simp	.....	Gdy	....
Giant 16.	4500	2850	Cont	4⅛x5¼	27.2	L	C	C	B	Sheb	G	Eis	...	L	B-Li	3	U	Spic	W	Shel	8.66:1	29.09:1	Math	36x4	36x7	Ross	144	Pier	Wan	.....	90
G.M.C. 41A.	4855	2950	Cont	4⅛x5¼	27.2	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x4	36x7	Jac	144	Mon	Own	SAE	74
G.M.C. 41B.	4910	2950	Cont	4⅛x5½	27.2	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	U	Own	W	Timk	9.25:1	37.5:1	Det	36x4	36x7	Jac	158	Mon	Own	SAE	74
Gramm-Bernstein 20.	4700	2900	Cont	4⅛x5¼	27.2	L	C	T	S	Strm	G	NE	...	D	Own	3	A	Own	W	Shel	7.75:1	28:1	.....	36x4	36x7	Ross	144	Pier	.....	Fir	91
Grant 15.	3400	2150	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	8:1	.....	Per	34x4	34x6	Jac	124	Pier	Bim	.....	67
Grant 16.	3500	2250	Cont	3¾x5	22.5	L	T	Fed	B	Cart	V	Spl	R	B	GLee	3	U	Arv	I	Torb	8:1	.....	Per	34x4	34x6	Jac	149	Pier	Bim	.....	70
Hahn DE.	4800	....	.....	4⅛	27.2	L	C	Own	F	Strm	...	Bos	...	D	B-Li	3	....	Spic	W	Shel	.....	.....	.....	36x4	36x6	Ross	142	Pier	.....	.....	....
Hall.	4560	2875	Cont	4⅛x5¼	27.2	L	P	H	B	Zen	G	Bos	...	L	B-Li	..	U	K-B	W	Timk	7.75:1	.....	Det	36x4	36x8	Gem	Q	Dup	Smi	.....	....
Hawkeye M.	4000	2650	Buda	4¼x5½	28.9	L	C	C	B	Zen	...	Eis	...	F	Full	4	....	Hart	I	Cl	.....	.....	Det	36x4	36x6	Ross	148	Simp	.....	.....	70
Hewitt-Ludlow.	4200	2950	Buda	4⅛x5½	27.2	...	...	T	...	Strm	...	Bos	...	B	Cott	..	....	Spic	W	Wis	.....	.....	.....	36x4	36x6	Ross	140	.....	.....	.....	....
H & M 2.	....	....	Her	3½x5	....	...	T	.....	...	.....	...	Bos	...	...	Full	...	...	.....	...	Torb	.....	.....	Math	36x6*	36x7*	Lav	144	.....	.....	.....	....
Hurlburt.	5600	3750	Buda	4¼x5½	28.9	L	C	T	B	Flch	G	Eis	...	D	B-Li	3	U	Spic	W	Flot	8.66:1	29.09:1	Per	36x4	36x4†	Ross	148	Dup	Wan	.....	....
Indepen't F, Dav'n't, Ia.	4500	2290	Cont	4⅛x5¼	27.2	L	C	C	B	Strm	V	Bos	...	F	Full	4	U	Bld	C	Dead	10.2:1	.....	G-C	36x6*	40x8*	Lav	146	.....	Pru	Fir	75
Indepen't G, Y'ngst'n, O.	3800	2300	Cont	4⅛x5¼	27.2	L	C	C	B	Zen	...	Eis	...	F	Full	3	....	Ster	W	Wis	.....	.....	S-El	34x3½	34x6	Wohl	144	.....	.....	.....	70
Indiana 25.	5200	2950	Rut	4⅛x5½	27.2	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Acme	W	½-Fl	7.75:1	37.5:1	S-El	36x4	36x8	Wohl	156	Pier	Bim	.....	71.5
International G.	4010	2600	Own	4 x5	25.6	O	T	Own	B	Ens	V	Dix	O	D	Own	3	A	Own	I	Own	9:1	30:1	.....	36x4	36x6	Own	138	Own	Own	Fir	90
Kalamazoo H.	5350	3200	Cont 6	3½x5¼	29.4	L	P	Hvn	B	Strm	V	Bos	D	B	Full	4	A	Acme	W	Wis	8.75:1	40.8:1	Shel	34x4	36x7	Ross	160	Pier	Bim	.....	....
Keldon 19.	5100	2885	Buda	4¼x5½	28.9	L	C	Eur	F	Strm	G	Eis	...	F	Full	4	U	Det	I	Russ	1.75:1	3.75:1	.....	36x4	36x7	Ross	144	Pier	Smi	Fir	80
King Zeitler.	4600	2950	Cont	4⅛x5¼	27.2	L	C	T	B	Strm	G	Bos	...	L	B-Li	4	A	Ther	W	Timk	7.75:1	37:1	Tut	36x4	36x7	Lav	150	.....	StM	SAE	80
Kissel Freighter.	4910	2975	Own	4¼x5½	28.9	L	C	McC	S	Strm	V	Eis	...	W	Warn	4	A	Spic	W	Timk	8.5:1	42.5:1	Math	36x4	36x7	Lav	168	Pier	Pru	.....	80
Kleiber BB.	....	3200	Cont	4⅛x5¼	27.2	...	...	.....	...	Strm	G	Bos	...	...	B Li	..	A	.....	W	.....	8.66:1	31:1	.....	36x4	36x7	Ross	153	.....	W&L	.....	....
Lange B.	5200	3000	Cont	4⅛x5¼	27.2	L	T	H	S	Strm	...	Bos	...	D	Cott	3	....	Hvn	C	Own	.....	.....	.....	36x4	36x6	Gem	136	Pier	.....	.....	90
Luedinghaus A.	4300	2490	Wau	4¼x5¾	28.9	L	G	T	B	Sheb	...	Mag	...	G	Det	3	U	Spic	W	Chi	8.66:1	26.6:1	Tut	36x4	36x7	Lav	145	Wau	Own	SAE	80
Luverne BBL.	....	1650	GBS	3¾x4¼	22.5	L	G	C	S	Sheb	G	Bos	D	D	Det	3	U	UP	I	Flot	8:1	30:1	Har	34x4*	34x5	Lav	136	.....	Own	Fir	....
Mack AB.	4900	3300	Own	4 x5	25.6	L	C	Own	S	Zen	G	Dix	E	L	B-Li	4	U	Bld	C	Dead	6.99:1	28.01:1	Mer	36x4	36x4†	Gem	144	Own	Sch	.....	71
Mack AB-Worm.	5000	3300	Own	4 x5	25.6	L	C	Own	S	Zen	G	Dix	E	L	B-Li	4	U	Spic	W	Timk	8.5:1	34.09:1	Mer	36x4	36x4†	Gem	144	Own	Sch	.....	71.5
Master M.	4300	2590	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	I	Torb	8:1	32:1	Det	34x4	36x7	Ross	144	McC	Pru	.....	76
Master O.	4400	2690	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	I	Torb	8:1	32:1	Det	34x4	36x7	Ross	170	McC	Pru	.....	76
Master T.	4500	2850	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	I	Torb	8:1	32:1	Det	34x4	36x4*	Ross	110	McC	Pru	.....	76
Master W.	4500	2890	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	W	Timk	8.5:1	34:1	Det	34x4	36x7†	Ross	144	McC	Pru	.....	76
Master WL.	4600	2990	Buda	4¼x5½	28.9	L	C	T	B	Mas	G	Eis	...	D	B-Li	4	U	Arv	W	Timk	8.5:1	34:1	Det	34x4	34x7†	Ross	170	McC	Pru	.....	80
Menominee D.	....	3245	Cont	4⅛x5¼	27.2	L	C	T	B	Strm	G	Eis	...	F	Full	4	U	Spic	W	Timk	9.25:1	40.08:1	Tut	36x4	36x4†	Ross	160	Mon	Stn	Fir	80
Muskegon 20.	4015	2325	Cont	4⅛x5¼	27.2	L	C	M	B	Stew	V	Eis	...	F	Full	3	U	Hart	I	Torb	9:1	27:2	Per	36x4	36x6	Lav	144	Pier	Pru	.....	75
Nash 3018.	3850	2250	Own	3¾x5¼	22.5	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Own	I	Celf	9:1	39.6:1	Math	34x4	34x6	Lav	144	Simp	AuW	.....	73.5
Nash Quad 4017.	6250	3250	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	I-Cl	4	A	Spic	F	Own	8.5:1	42.3:1	Math	36x5	36x5	Lav	124	Simp	.....	.....	55
Nelson & LeMoon F2.	4100	2775	Cont	4⅛x5¼	27.2	L	C	T	S	Strm	G	Bos	W	L	B-Li	3	U	Own	W	Timk	7.75:1	2:1	Tut	36x4	36x7	Lav	Q	Pier	Pru	Gdy	80
Netco D.	5900	3000	Cont	4⅛x5¼	27.2	L	C	RT	S	Zen	G	Eis	...	L	B-Li	3	U	Hart	W	Timk	9.25:1	36:1	Per	36x4	36x7	Ross	144	.....	Arc	SAE	80
Noble C40.	4500	....	Buda	4 x5½	25.6	...	C	T	...	Strm	G	Eis	...	F	Full	3	U	.....	...	Shel	7.75:1	.....	S-El	36x4	36x7	Lav	160	Pier	Bim	Q	....
Northway B2.	6050	3250	Own	4 x6	25.6	O	C	GO	B	Sheb	V	Bat	W	F	Full	4	U	Spic	W	Shel	7.75:1	37.2:1	Per	36x5	38x10	Ross	146	Pier	.....	.....	....
Northwestern WT.	4900	2950	Cont	4⅛x5¼	27.2	L	C	MR	S	Strm	...	Bos	...	H	Selec	3	....	Bld	W	Shel	.....	.....	Shel	34x4	36x7	Ross	164	.....	.....	.....	80

2 Ton—Continued

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
Ogden B1	4300	2695	Cont	4 1/8x5 1/4	27.2	L	C	T	B	Rayf	G	Bos	...	B	B-Li	4	U	Acme	W	Timk	8.5:1	12.50:1	Tut	36x4	36x7	Gem	160	Pier	Stn	.....	70
O.K. 2T	4000	2850	Buda	4 1/8x5 1/2	27.2	L	C	T	B	Zen	V	Eis	...	D	Selec	3	U	Hart	W	Wis	8.75:1	56.87:1	Tut	36x4	36x7	Ross	150	Pier	.....	SAE	85
Oneida C9	....	2900	Own	4	25.6	L	C	..	..	C	..	Mag	...	...	Own	3	...	.....	...	.....	.....	.....	S-El	36x4	36x7	.....	160	Pier	.....	.....	82.5
Oshkosh AA4	4200	3600	H-Sp	3 1/4 x5	16.9	L	T	C	B	Zen	V	Bat	N	L	B-Li	4	U	Peters	B	Flot	8.25:1	33:1	Tut	36x6*	36x6*	Own	165	Dup	Bim	Fir	60
Oshkosh A4	4200	3500	H-Sp	3 1/4 x5	16.9	L	T	C	B	Zen	V	Bat	N	L	B-Li	4	U	Peters	B	Flot	8.25:1	33:1	Tut	36x6*	36x6*	Own	130	Dup	Bim	Fir	60
Packard 2E	5100	3600	Own	4 x5 1/2	25.6	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	7.25:1	33.3:1	.....	34x4	34x4†	Own	144	Own	.....	.....	48.2
Parker F9W	4500	3500	Wis	4 x6	25.6	L	C	O	F	Strm	G	Bos	W	L	Full	4	A	Arv	W	Own	7.75:1	37.2:1	S-El	34x4	34x6†	Ross	150	Mon	Bim	.....	80
Pierce-Arrow X4	6150	4300	Own	4 x5 1/2	25.6	T	P	C	T	F	Own	G	Dix	...	C	Selec	4	A	Own	W	Flot	7:1	37.08:1	S-El	36x4	36x4†	Own	150	Own	Own	Own	70
Pioneer F	....	2390	Cont	4 1/8x5 1/4	27.3	...	C	.....	.....	Strm	..	Eis	...	..	B-Li	4	...	.....	...	W	Timk	.....	.....	.....	36x4	36x7	.....	164	.....	.....	.....	.....
Rainier R8	3600	2400	Cont	3 3/4 x5	22.5	L	T	Har	B	Zen	V	Sim	...	D	B-Li	3	U	Hart	W	Shel	8.66:1	28.83:1	Per	34x4	34x6	Ross	147	Mon	Sch	.....	80
Rowe CDW	4500	3000	Wis	4 x5	32	L	C	M	F	Zen	G	Bos	...	L	B-Li	4	U	Arv	W	Shel	7.75:1	11.75:1	Shel	34x4	34x4†	Ross	142	Simp	Hoo	.....	53
Royal	....	3200	Wis	4 x5	25.6	...	C	T	...	Strm	...	Bos	Q	B	Own	..	...	Own	W	Timk	.....	.....	Mer	36x4 1/2	36x6	Ross	...	Mon	.....	.....	...
Sandow I	3800	2375	Cont	3 3/4 x5	22.5	L	P	T	B	Strm	G	Eis	...	D	Full	3	U	K-B	I	Torb	10:1	30:1	GC	36x4	36x6	Ross	150	.....	Pru	.....	70
Schacht	5500	3350	Buda	4 1/4 x5 1/2	28.9	L	P	Own	F	Sheb	G	Bos	...	H	Own	3	A	Flex	W	Own	8.66:1	27.06:1	Nat	36x4	36x7	Own	144	Dup	StM	.....	70
Schwartz C	4000	2675	Cont	4 1/8x5 1/4	27.2	L	C	Fed	B	Strm	G	Bos	...	L	B-Li	3	U	Hart	I	Torb	9.1:1	36.49:1	Row	36x4	36x7	Ross	146	Pier	Sch	.....	....
Schwatrz 2C	4000	2675	Cont	4 1/8x5 1/4	27.2	L	P	Fed	B	Strm	...	Bos	...	L	B-Li	3	....	Hart	I	Torb	.....	.....	Row	36x4	36x7	Ross	132	Pier	Sch	.....	....
Selden 2 1/2 A	5400	3290	Cont	4 1/8x5 1/4	27.2	L	P	Bus	B	Strm	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	7.75:1	37.5:1	Per	36x4	36x7	Gem	145	Pier	Arc	.....	70
Signal J	5010	3100	Cont	4 1/8x5 1/4	27.2	L	C	McC	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	9.25:1	4:1	Det	34x4	36x8	Ross	150	Pier	Hay	Gdy	80
Standard 76	4430	2800	Cont	4 1/8x5 1/4	27.2	L	C	T	B	Strm	G	Eis	...	D	B-Li	4	A	Spic	W	Timk	7.75:1	37.6:1	.....	36x4	36x6	Ross	140	.....	.....	.....	70
Stewart 7	4460	2575	Cont	4 1/8 x5 1/4	27.2	L	P	T	B	Zen	G	Eis	...	F	Full	3	U	Hart	I	Own	9:1	27:1	Det	34x4	34x4†	Ross	156	Pier	Wan	Fir	72
Stoughton D	....	....	.....	4 x5 1/2	25.6	...	C	Own	C	Strm	G	Eis	...	D	B-Li	3	U	.....	W	Shel	7.8:1	.....	S-El	36x4	36x7	.....	140	.....	Own	Gdy	....
Sullivan E	4500	2975	Buda	4 1/8x5 1/2	27.2	L	P	V	F	Strm	V	Bos	...	L	B-Li	3	U	Spic	W	Timk	7.75:1	26:1	Shel	36x4	36x7	Ross	150	.....	Wan	.....	71
Sullivan EL	4500	3050	Buda	4 1/8x5 1/2	27.2	L	P	V	F	Strm	...	Bos	...	L	B-Li	3	....	Spic	W	Timk	.....	.....	Shel	36x4	36x7	Ross	168	.....	.....	.....	71
Superior E	3600	2275	Cont	4 1/8x5 1/4	27.2	L	P	I	F	Strm	...	Eis	...	F	Full	3	....	Arv	I	Torb	.....	.....	Tut	36x4	36x6	Ross	144	Pier	Sch	Fir	....
Traffic	3175	1395	Cont	3 3/4 x5	22.5	L	T	C	S	Cart	G	Bos	...	C	Covt	3	U	UM	I	Russ	8.2:1	22.96:1	Det	34x3 1/2	34x5	Dit	133	.....	Roy	Fir	70
Transport 50	4250	2585	Cont	4 1/8x5 1/4	27.2	L	P	C	B	Strm	G	Eis	...	F	Full	4	U	Hart	I	Cl	8.15:1	39:1	Det	36x4	36x7	Jac	150	Dup	.....	Fir	70
Triangle C	2500	....	Wau	3 3/4 x5 1/4	22.5	L	C	Per	S	Strm	...	Eis	...	F	Full	4	....	UP	I	Cl	.....	.....	Det	36x3 1/2	36x6	Gem	146	Wau	.....	.....	....
Triumph 2	4900	2850	Buda	3 3/4 x5 1/8	22.5	...	C	H	S	Strm	V	Dix	...	B	Cott	3	U	Hart	I	Russ	.....	8:1	S-El	36x4	36x3 1/2†	Lav	144	Pier	Stn	Stn	78
Velie 25-B	5100	2950	Cont	4 1/8x5 1/4	27.2	L	C	T	F	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Timk	7.75:1	31:1	Math	36x4	36x7	Gem	152	Pier	Bim	Gdy	80
Vim 22	4700	3150	Her	3 3/4 x5 1/8	22.5	L	C	McC	C	Zen	G	Dix	...	D	Selec	4	U	Spic	W	Shel	7.75:1	11.75:1	Shel	36x4	36x6	Gem	142	Dup	Smi	.....	....
Ward LaFrance 2A	5260	3350	.....	4 1/8x5 1/4	27.2	L	G	O	S	Zen	G	Mag	...	B	B-Li	4	A	Spic	W	Timk	7.75:1	37.5:1	.....	36x4	36x7	Ross	154	Simp	.....	.....	85
White 20	4150	3300	Own	3 3/4 x5 1/8	22.5	L	C	C	B	Own	G	Mag	...	D	Selec	4	A	Own	R	Own	.....	.....	.....	36x4	36x7	Own	157	.....	.....	Fir	70
Wichita M	4700	2750	Wau	3 3/4 x5 1/4	22.5	L	P	Per	C	Strm	G	Bos	...	C	Covt	3	A	Own	W	Shel	10.66:1	3.65:1	.....	36x4	36x6	Ross	144	Wau	Bim	Fir	....
Wilson E	4500	2950	Cont	4 1/8x5 1/4	27.2	L	C	T	B	Mar	G	Eis	...	C	Covt	3	A	K-B	W	Timk	8.6:1	31.3:1	Tut	36x4	36x7	Ross	144	Pier	.....	.....	80
Winther 49	5300	3000	Wis	4 x6	25.6	L	P	T	G	Mas	V	Eis	B	F	Full	3	A	Bld	I	Cl	8.12:1	32.5:1	Math	34x4	36x4†	Ross	150	.....	Own	.....	80
Witt-Will WD2-19	4550	2950	Cont	4 1/8x5 1/4	27.2	L	G	C	B	Zen	V	Eis	...	D	Selec	3	U	Spic	W	Timk	7.8:1	23.4:1	S-El	36x3 1/2	36x7	Ross	144	Pier	Arc	SAE	70

2½ Ton

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
Acason H	4354	3150	Wau	4 1/4 x5 3/4	28.9	L	P	Can	S	Sheb	V	Eis	...	B	Cott	3	U	Bld	W	Timk	8.5:1	40.37:1	Det	36x4	36x7	Ross	150	Wau	Bim	.....	76
Ace	5300	....	Buda	4 1/4 x5 1/2	28.9	L	C	Spi	F	Sheb	G	AtK	W	L	B-Li	4	A	Spic	W	Timk	7.75:1	31:1	Math	36x4	36x7	Ross	156	Pier	Day	.....	....
Apex E	4500	2450	Buda	4 1/4 x5 1/2	28.9	L	C	Can	P	Strm	V	Eis	Q	F	Full	3	U	UP	I	Torb	9:1	27:1	Det	36x4	36x6	Lav	150	Dup	.....	Fir	70
Atterbury 7CX-LWB	5325	3275	Cont	4 1/8 x5 1/4	27.2	L	C	T	S	Zen	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	9.25:1	37:1	SP	36x4	36x4†	Gem	171	Mon	Arc	Fir	92.5
Atterbury 7CX-STD	5260	3175	Cont	4 1/8 x5 1/4	27.2	L	C	T	S	Zen	G	Eis	...	L	B-Li	4	U	Spic	W	Timk	9.25:1	37:1	SP	36x4	36x4†	Gem	153	Mon	Arc	Fir	92.5
Available H2 1/2	5200	....	Cont	4 1/8 x5 1/4	27.2	L	C	T	B	Strm	G	Bos	...	L	B-Li	4	A	Spic	W	Wis	8.66:1	34.66:1	Tut	36x4	36x8	Ross	152	Pier	Sch	.....	75
Bessemer J-2	4500	2785	Cont	4 1/8 x5 1/4	27.2	L	C	C	B	Rayf	...	Bos	...	B	B-Li	4	....	Arv	I	Torb	.....	.....	Per	36x4	36x4†	Ross	158	Pier	.....	.....	67
Bethlehem E	3910	2365	Own	4 x4 1/2	25.6	L	T	Fed	B	Sheb	G	Will	G	B	Det	3	U	UP	I	Russ	8.8:1	28.16:1	Shel	34x4	34x6	Lav	144	Mon	Wan	Fir	85
Betz D2	4750	2785	Buda	4 1/4 x5 1/2	28.9	L	C	T	F	Strm	...	Bos	...	L	B-Li	4	....	UM	W	Timk	.....	.....	Tut	36x4	36x7	Ross	150	Pier	.....	.....	75
Brinton F	4500	3000	Cont	4 1/8 x5 1/4	27.2	L	C	T	F	Strm	G	Bos	...	D	Selec	3	U	Spic	W	Flot	1:1	3.36:1	S-El	36x4	36x6	Ross	Q	Pier	Sch	.....	....
Brockway K4	4700	3000	Cont	4 1/8 x5 1/4	27.2	L	C	Bus	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	8.5:1	34:1	Mer	36x4	36x7	Gem	152	Mon	Hoo	.....	80
Chicago C2 1/2	4500	3000	Her	4 x5 1/8	25.6	L	..	T	F	Strm	G	Bos	...	L	B-Li	4	U	Peters	W	Timk	8.5:1	34:1	Math	36x4	36x7	Gem	156	Simp	Q	Stn	....
Clydesdale 65X	4850	3175	Cont	4 1/8 x5 1/4	27.2	L	C	T	S	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	8.5:1	34:1	Stan	36x4	36x4†	Gem	163	Own	Smi	.....	73
Columbia G	4800	2750	Hink	4 x5 1/4	25.6	L	C	T	F	Strm	V	Bos	...	B	Covt	3	A	Spic	I	Russ	9.5:1	.....	Per	36x4	36x7	Own	144	Hink	.....	.....	80
Concord B	4600	3200	Buda	4 1/4 x5 1/2	28.9	L	C	T	S	Zen	...	Eis	...	L	B Li	4	....	Spic	W	Timk	.....	.....	Per	36x4	36x4†	Ross	150	Mon	.....	.....	70
Corbitt B	5000	3500	Cont	4 1/8 x5 1/4	27.2	L	C	McC	B	Strm	V	Eis	...	D	B-Li	4	U	Hart	W	Shel	8.75:1	35:1	Shel	36x4	36x7	Ross	148	Simp	Bim	Fir	75
Dart CC	4785	2950	Buda	4 1/4 x5 1/2	28.9	L	C	C	F	Zen	G	Eis	...	F	Full	4	U	Spic	W	Timk	8.5:1	38:1	Per	36x4	36x7	Ross	150	Simp	Pru	.....	80
Day-Elder C	4600	2850	Buda	4 1/4 x5 1/2	28.9	L	P	Bus	B	Zen	G	Eis	...	D	Covt	3	U	Hart	W	Wis	10.67:1	39.8:1	Shel	36x4	36x7	Ross	150	Mon	Jon	.....	72
DeKalb E2 1/2	4800	2600	Cont	4 1/8 x5 1/4	27.2	L	P	T	F	Mas	G	Eis	...	F	Full	3	U	K-B	W	Flot	9.33:1	33:1	Math	36x5	36x6	Ross	144	.....	Hay	.....	71
Denby 25	4790	3250	Cont	4 1/8 x5 1/4	27.2	L	C	L	B	Strm	G	Eis	...	F	Full	4	....	UP	I	Russ	10.9:1	52.3:1	Det	36x4	36x7	Gem	150	Mon	Sim	.....	79
Doane 1919	5000	3750	Wau	4 1/4 x5 3/4	28.9	...	C	C	S	Mas	...	Bos	...	D	Selec	4	....	D	C	Dead	.....	.....	.....	36x5	36x7	Lav	156	Wau	.....	.....	79
Douglas E	4500	2525	Buda	4 1/4 x5 1/2	28.9	L	C	Own	F	Sheb	...	Eis	...	F	Full	4	....	Arv	I	Torb	.....	.....	Own	34x4	36x7	Ross	155	Pier	.....	.....	65
Erie 2 1/2	5400	....	Buda	4 1/4 x5 1/2	28.9	L	C	McC	B	Strm	...	Bos	...	D	Full	4	....	Spic	W	Shel	.....	.....	Per	34x4	36x6	Ross	150	Pier	.....	.....	80
Fageol 3400	4600	....	Wau	4 1/4 x5 3/4	28.9	L	C	Spi	S	Zen	G	Dix	...	B	Selec	5	A	Spic	W	Timk	5.6:1	59.5:1	Math	34x4	36x7	Ross	144	Wau	Pru	.....	80
Gary J	4850	2750	Buda	4 1/4 x5 1/2	28.9	L	C	T	F	Mas	G	Eis	...	D	B-Li	4	U	Spic	W	Timk	8.5:1	40.8:1	S-El	36x4	36x7	Ross	148	Pier	Pru	Gdy	....
Gersix G	5200	3150	Buda6	3 1/2 x5 1/4	29.4	L	C	I	S	Strm	V	Bos	W	B	Cott	3	U	Bld	W	Own	9.66:1	39:1	Tut	36x4	36x7	Ross	150	Mon	Jon	.....	75
Gersix K	5200	3150	Buda	4 1/4 x5 1/2	28.9	L	C	I	F	Strm	V	Bos	...	B	Cott	3	U	Bld	W	Own	9.66:1	39:1	Tut	36x4	36x7	Ross	150	Mon	Jon	.....	75
Gramm-Bernstein 25	5300	3650	Hink	4 1/4 x5 1/2	28.9	L	C	T	F	Strm	V	Eis	...	D	Own	4	A	Own	W	Stan	7.75:1	36.7:1	.....	36x4	36x4†	Ross	150	.....	.....	Fir	91.3
Hahn EE	5000	....	.....	4 1/2	32.4	L	C	Own	F	Strm	...	Bos	...	D	B-Li	3	....	Spic	W	Timk	.....	.....	.....	36x4	36x8	Ross	145	Pier	.....	.....	...
Harvey WFA	5300	3300	Buda	4 1/4 x5 1/2	28.9	L	P	.....	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	7.75:1	31:1	Shel	36x4	36x7	Ross	150	Dup	Sch	.....	60
Hendrickson I	....	3000	Buda	4 1/4 x5 1/2	28.9	L	C	T	F	Strm	G	Dix	...	D	Full	4	A	Ther	W	Timk	7.75:1	37.2:1	S-El	36x4	36x7	Ross	Q	Pier	.....	.....	80

Hewitt-Ludlow	4800	3300	Buda	4¼x5½	28.9			T	F	Strm				B	Cott	4		Spic	W	Wis				36x4	36x7	Ross	150								
Jumbo C	4450	2900	Buda	4¼x5½	28.9	L	C	GO	F	Zen	G	Eis		F	Full	3	U	Arv	I	Cl	9:1	31.5:1	Det	36x4	36x7	Jac	108	Dup	Mil			60			
Jumbo E	4500	2775	Buda	4¼x5½	28.9	L	C	GO	F	Zen	G	Eis		F	Full	3	U	Arv	I	Cl	9:1	31.5:1	Det	36x4	36x7	Jac	168	Dup	Mil			60			
Kankakee E	3500	2465	Cont	6 3½x5¼	29.4	L	C	H	B	Zen	V	Will	D	D	Mun	3	U	Acme	I	Russ	7.4:1	22.2:1	Tem	34x4	34x6	Ross	170		Bim	Gdy		70			
Kelly-Springfield K35	5200	3500	Own	3¾x5¼	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.64:1	35.11:1	Per	36x4	36x4†	Gem	144	Pier	StM			89			
Kelly-Springfield K36	5540	3500	Own	3¾x5¼	22.5	L	C	Fed	F	Zen	G	Eis	W	C	Covt	3	A	Spic	W	½-Fl	10.33:1	34.02:1	Per	36x4	36x4†	Gem	144	Pier	StM			89			
Keystone 40	3600	1795	Own	4 x4½	25.6	L	T	McC	B	Zen	G	Ber		F	Full	3	U	Spic	I	Russ	8.88:1	26.6:1	Row	34x3½	36x5	Dit	144	Pier	Hoo	Gdy		75			
Kimball C			Wis	4¼x6	28.9	L	C	Flex	B	Zen	V	Eis		L	B-Li	4	A	Spic	W		7.75:1	37.31:1	US	36x4	36x7	Lav	Q	Dup				80			
Kleiber B		3800	Cont	4½x5½	32.4					Strm	G	Bos			B-Li		U		W		39.8:1	31:1		36x4	36x8	Ross	160		W&L						
Koehler M	5050	2985	Her	4 x5½	25.6	L	C	T	P	Zen	G	Eis		D	B-Li	4	A	Spic	W	Timk	9.25:1	37:1	Math	36x4	36x7	Lav	162	Simp	Wan	SAE		75			
Larrabee-Deyo CD	5200	3250	Cont	4½x5¼	27.2	L	C	Bus	S	Strm		Bos		L	B-Li	4		M	W	Shel			Mer	36x4	36x7	Ross	154	Pier							
L.M.C	4500	2700	Cont	4½x5¼	27.2	L	C	T	S	Strm	P	Bos	R	B	Det	4	A	Ther	I	Russ	8.8:1		Math	36x4	36x4†	Lav	164	Pier				80			
Maccar H	5000	3500	Cont	4½x5½	32.4	L	C	Own	B	Strm	G	Bos		L	B-Li	3	U	Spic	W	Timk	7.75:1	31.08:1	Mer	36x4	36x4†	Ross	162	Pier	Sch	Fir		70			
Moreland 19C	5380	3775	Cont	4½x5½	32.4	L	C	C	F	Mill	G	Dix		D	Selec	4	A	Ther	W	Timk	6.8:1	32.9:1	US	36x4	36x7	Ross	Q		Smi	SAE					
Netco H	6500	3400	Cont	4½x5½	32.4	L	C	R-T	S	Zen	G	Eis		L	B-Li	4	A	Hart	W	Timk	7.75:1	39:1	Per	36x4	36x8	Ross	170		Arc	SAE		75			
Noble D50	5000		Buda	4½x5½	27.2		C	T		Strm	G	Eis		F	Full	4	A		W	Shel	7.25:1		S-El	36x4	36x8	Lav	176	Pier	Bim	Q		80			
Old Reliable B	5750	3250	Wis	4¼x6	28.9	L	C	T	B	Strm	V	Bos		L	Full	4	A	Spic	W	Shel	7.75:1	37.2:1	Shel	34x4	36x4†	Ross	160	Mon	StM			70			
Paige 50-18	5200	2950	Cont	4½x5¼	27.2	L	C	T	B	Strm	G	Bos		D	Selec	4	A	Spic	W	Timk	8.5:1	40.88:1	Per	36x4	36x7	Jac	150	Pier	Sch			80			
Patroit Washington	4600	3150	Cont	4½x5¼	27.2	L	C	Own	B	Strm	V	Bos		B	Selec	4	A	Ther	W	Timk	9.66:1	38.64:1	S-El	34x4	34x7	W	156	Pier		Gdy		80			
Pittsburger B	5500	3200	Cont	4½x5¼	27.2	L	C	T	F	Strm	V	Bos		L	B-Li	4	U	Spic	W	Shel	8.75:1	35.8:1	S-El	36x5	36x7	Ross	160	Mon	Smi			67.5			
Reliance 20	5500	3200	Buda	4¼x5½	28.9	L	C	H	F	Strm	G	Eis		F	Full	4	A	Acme	E	Badg	9.6:1	46:1	Shel	36x4	36x4†	Ross	156	Pier	Bim	Gdy		90			
Republic 19	4150	2395	Cont	4½x5¼	27.2	L	C	C	B	Strm	G	Eis		D	Full	4	U	Arv	I	Torb	8:1	36.4:1	S-El	36x4	36x7	Jac	144	Phar	Pru	Fir					
Rock Falls	2800		Buda	6 3½x5¼	29.4	L	P	H	B	Rayf	V	Bos	W	B	GLee	3	U	Spic	G	Flot	4.57:1		Tut	35x5	35x5*	Gem	150		Mut	Fir		60			
Rowe CDW	4600	3250	Wis	4 x5	25.6	L	C	May	F	Zen	G	Bos		L	B-Li	4	U	Arv	W	Shel	7.74:1	11.75:1	Shel	34x4	36x4†	Ross	164	Simp	Hoo			61			
Royal		3500	Wis	4½x6	29.8		C	T		Strm		Bos	Q	B	Own	4		Own	W	Timk			Mer	36x4½	36x6	Ross	132	Mon							
Sandow J	4500	2975	Cont	4½x5¼	27.2	L	P	T	B	Strm	G	Bos		B	B-Li	4	U	K-B	W	Timk	9.25:1	31:1	GC	36x4	36x7	Ross	165	Mon	Pru			70			
Sanford 25	5200	3000	Cont	4½x5½	27.2	L	P	T	F	Strm	G	Bos		B	B-Li	4	A	Spic	W	Shel	8.75:1	13.15:1	S-El	36x4	36x4†	Ross	156	Pier	Hoo	Fir		75			
Schacht	6000	3650	Buda	4¼x5½	28.9	L	P	Own	F	Sheb	G	Bos		H	Own	3	A	Flex	W	Own	9.66:1	30.19:1	Nat	36x4	36x4†	Own	156	Dup	StM			70			
Schwartz C	4000	2775	Cont	4½x5¼	27.2	L	P	Fed	B	Strm	G	Bos		L	B-Li	3	U	Hart	I	Torb	10.2:1	40.8:1	Row	36x4	36x7	Ross	168	Pier	Sch						
Service 51	5180	3245	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Eis		D	Selec	4	A	Spic	W	Timk	7.75:1	37.5:1		36x4	36x7	Ross	160	Simp	Bim			75			
Sterling 2½	5500	3245	Ster	4¾x5¾	30.6	L	C	Own	P	Rayf	V	Eis		L	B-Li	4	U	Spic	W	Timk	7.7:1	37.26:1	Math	36x4	36x4†	Ross	156	Wau	Wan			88			
Stoughton E				4½x5½	32.4		C	Own	C	Strm	G	Eis		D	B-Li	3	U		W	Shel	7.8:1		S-El	36x4	36x4.		155		Own	Gdy					
Tiffin MW	4890	3050	Cont	4½x5¼	27.2	L	C	T	B	Sheb	G	Bos		F	Full	3	U	Acme	W	Shel	8.7:1	41.7:1	Kal	36x4	36x4½†	Ross	148	Pier	Smi	Gdy		80			
Titan	4950	2950	Buda	4¼x5½	32.4	L	C	T	F	Strm	G	Eis		D	Cott	4			I	Cl		5.2:1	S-El	34x4	36x4†		156								
Tower H2½	4700	3200	Cont	4½x5¼	27.2	L	C	T	S	Strm	G	Bos		F	Full	3	U	Spic	W	Timk	9.25:1	33:1	Det	36x4	36x7	Ross	146	Pier		Fir		70			
Triangle B	4900	2850	Rut	4½x5½	27.2	L	C	Per	F	Strm	G	Eis		F	Full	4	U	UP	I	Cl	8:1	39:1	Det	36x4	36x7	Gem	151	Pier	Roy	Fir		60			
Union F	4800	2675	Wis	4 x6	25.6	L	P	GO	F	Sheb	G	Eis		F	Full	4	U	UP	I	Russ	7.8:1	37.4:1	Math	36x4	36x7	Ross	152	Dup	Pru			70			
United B		2750	Buda	4¼x5½	28.9	L	C	T	F	Strm		Eis	Q	L	B-Li	4		Bld	I	Cl				36x4	36x7	Ross	Q	Simp				80			
U.S.H	5200	3250	Cont	4¼x5½	28.9	L	C	T	S	Strm	G	Eis		H	B-Li	4	A	Q	W	Shel	7.75:1	31:1	Shel	34x4	36x4†	Lav	144	Pier	Sch			80			
Ward LaFrance 2A	5260	3350		4½x5¼	27.2	L	G	O	S	Zen	G	Mag		B	B-Li	4	A	Spic	W	Timk	7.75:1	37.4:1		36x4	36x7	Ross	154	Simp				85			
Wichita R	5200	2950	Wau	3¾x5¼	22.5	L	P	Per	C	Strm	G	Bos		C	Covt	3	A	Own	W	Shel	10.66:1	3.65:1		36x4	36x7	Ross	144	Wau	Smi	Fir					
Wilcox Q	4700		Own	4¼x5½	28.9	L	P	T	S	Strm	G	Mag		W	Selec	4	A	Own	W	½-Fl	8.6:1	42.35:1	Shel	36x4	36x3½†	Ross	135	Pier	Smi			80			

3 Ton

3 Ton

Beck-Hawkeye D	6000	3700	Cont	4½x5½	32.4			P	H	F	Strm	G	Bos		F	Full	3	U	Bld	I	Cl	9:1	2:1	Hig	36x5	36x8†	Lav	160	Pier	Simp	Fir		70			
Forschler B-X	4725	3450	Cont	4½x5¼	27.2	L	C	Own	B	Zen		Bos	Q	F	Full	4		Hart	W	Shel			Own	36x4	36x8	Ross	137	Dup	Smi						
F.W.D.-B	6300	4500	Wis	4¾x5½	36.1	T	C	T	F	Strm	G	Eis		D	Cott	3	A	Q	B	Flot	8.9:1	35.6:1	Tut	36x6	36x6	Ross	124	Pier	Sch	Q		55			
Kimball K			Wis	4¾x5½	36.1	T	C	Flex	F	Zen	V	Ber		L	B-Li	4	A	Spic	W	Shel	7.75:1	37.31:1	US	36x4	36x8	Ross	Q	Dup	Smi			80			
O.K. 3T	4250	3350	Buda	4¼x5½	28.9	L	C	T	B	Zen	V	Eis		D	Selec	4	U	Hart	W	Wis	8.75:1	56.87:1	Tut	36x4	36x8	Ross	154	Pier		SAE		85			
Packard 3E	7000	4350	Own	4½x5½	32.4	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	9:1	41.3:1		36x5	36x5	Own	156	Own				52.1			
Rennoc M	5050	2895	Buda	4½x5½	27.2	L	C	T	F	Strm		Spl		W	Warn	4		Hart	W	Wis			Row	36x5	36x7	Lav	144	Pier				65			
Riker B	6900	4600	Own	4¼x6	28.9	T	C	T	B	B&B	G	Ber	W	C	Selec	4	A	Own	W	Own	10:1	42.5:1		36x5	36x5†	Ross	150	Own				75			
Rowe GW	5500	4500	HSp	8 3¾x5	45		L	C	May	F	Zen	V	AtK.	W	L	B-Li	4	U	M	W	Shel	7.35:1	11.75:1	Shel	37x7*	42x9*	Ross	170		Hoo	Hoo		55			
Vim 23	6000	3950	Her	4¼x5½	28.9	L	C	T	McC	F	Zen	G	Dix		D	Selec	4	A	Spic	W	Shel	7.75:1	11.75:1	Shel	36x5	36x5†	Gem	175	Dup	Smi						
White 40	7050	4300	Own	3¾x5¾	22.5	L	C	T	F	Own	V	Mag		D	Selec	4	U	Own	R	Own				36x5	40x5†	Own	174	Own				70			
Winther 69	6400	3900	Wis	4 x6	25.6	L	P	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	9:1	36:1	Math	36x5	36x5†	Ross	150		Cla	Fir		85			

3½ Ton

3½ Ton

Acason L	6400	4150	Wau	4¼x6¾	28.9	L		P	Can	S	Sheb	V	Eis		B	Cott	3	U	Bld	W	Timk	10.33:1	49:1	Det	36x5	36x5†	Ross	172	Wau	Bim			76			
Acme C	6516	3875	Cont	4½x5½	32.4	L	C	GO	B	Rayf	V	Eis		B	Cott	3	A	Bld	W	Timk	10.33:1	41.3:1	Det	36x5	40x5†	Ross	168	Dup	Bim	Stn		80			
Armleder KW	6600		Cont	4½x5½	32.4	L	C	T	F	Zen	G	Bos		D	B-Li	3	U	Opt	W	Timk	8.75:1	35:1	Math	36x5	36x5†	Ross	156	Mon	StM			60			
Atterbury 7D-LWB	7000	4075	Cont	4½x5½	32.4	L	C	T	S	Zen	G	Eis		L	B-Li	4	U	Spic	W	Timk	12:1	48:1	SP	36x5	40x5†	Gem	192	Mon	Arc	Fir		92			
Atterbury 7D Standard	6910	3875	Cont	4¼x5½	32.4	L	C	T	S	Zen	G	Eis		L	B-Li	4	U	Spic	W	Timk	10.33:1	41.3:1	SP	36x5	40x5†	Gem	167	Mon	Arc	Fir		98			
Available H3	6400		Cont	4½x5½	32.4	L	C	T	B	Strm	G	Bos		L	B-Li	4	A	Spic	W	Wis	10.33:1	41.33:1	Tut	36x5	40x5†	Ross	176	Pier	Sch			75			
Bethlehem F	4983	3465	Own	4 3/8x6	30.6	L	P	Fed	B	Sheb	G	Will	G	B	Det	3	U	Spic	I	Russ	9.4:1	30.08:1	Shel	34x4	34x5†	Lav	162	Pier	Wan	Fir		85			
Brockway R2	6800	3900	Cont	4½x5½	32.4	L	C	T	Bus	B	Strm	G	Eis		L	B-Li	4	A	Spic	W	Timk	10.33:1	41.4:1	Mer	36x5	36x5†	Gem	164	Q	Smi			70			
Chicago C3½	6900	4300	Her	4½x5½	32.4	L				F	Strm	G	Bos	G	L	B-Li	4	A	Peters	W	Timk	10.33:1	50:1	Math	36x5	36x10	Gem	168	Simp	Q	Stn					
Clydesdale 90	6600	4075	Cont	4½x5½	32.4	L	C	T	S	Zen	G	Bos		L	B-Li	4	A	Spic	W	Timk	10.33:1	50:1	Stan	36x5	40x5†	Ross	170	Own	Smi			78			
Corbitt A	6780	4200	Cont	4½x5½	32.4	L	C	McC	B	Strm	V	Eis		D	B-Li	4	U	Hart	W	Shel	11.75:1	47:1	Shel	36x5	36x10	Ross	178	Pier	Smi			75			
Couple Gear HC	9000	6100	Wis	5.1x5½	41.9	T	G	H	F	Strm	G	Eis			Own	5		Own	B	Own	25:1		Tut	36x4†	36x4†	Own	144		Own	Own		55			
Dart L	6740	4000	Buda	4½x6	32.4	L	C	C	F	Zen	G	Eis		W	Warn	4	A	Spic	W	Timk	10.75:1	53.6:1	Per	36x5	36x10	Ross	160	Simp	Pru			75			
Day-Elder F	5600	3550	Cont	4½x5½	32.4	L	P	Bus	B	Zen	G	Eis		D	B-Li	4	U	Hart	W	Wis	11.75:1	47:1	Shel	36x5	36x5†	Ross	165	Mon	Jon	Stn		73			
Denby 27	6890	4250	Cont	4½x5½	32.4	L	C	T	Lng	B	Strm	G	Eis		D	Warn	4	A	UP	I	Cl	10:1	49.9:1	Det	36x5	36x10	Ross	170	Simp	Smi			78			
Diamond T-LB	6425	4390		4½x5½	32.4	L	C	T	B	Strm	G	Bos		L		4	A	Spic	W		8.75:1	42.35:1	Math	36x5	36x5†		170	Pier							
Dorris K7	6500	4200	Own	4¼x5½	28.9	O	P	C	T	F	Strm	G	Bos		L	Warn	4	A	Spic	W	Timk	10.33:1	51.5:1	Row	36x5	36x10	Ross	174	Own	Smi			70			
Duplex E	6050	4000	Buda	4½x5½	28.9	O	P	C	L	B	Sheb	V	Eis			B-Li	4	U	Peters	I	Own	8:1	32:1	Tut	36x6	36x6	Wohl	130		Pru			60			
Erie 3½	7200		Buda	4¼x5½	28.9	L	C	C	MeC	B	Strm		Bos		D	Full	4		Spic	W	Shel			Per	36x5	40x5†	Ross	168	Pier				80			
Fageol 4500	7300		Wau	4½x6¼	32.4	L	C	C	Spi	S	Zen	V	Dix		B	Selec	5	A	Spic	W	Timk	6.3:1	67:1	Math	36x5	36x5†	Ross	172	Wau	Pru						
Federal WD	7000	3650	Cont	4½x5½	32.4	L	C	T	B	Zen	G	Eis		B	Own	4	A	Spic	W	Timk	10.33:1	51.54:1	Math	36x5	36x5†	Gem	156	Phar	Smi			74.5			
Garford 77C	7235	4300	Wis	4¾x5½	36.1	T	C	T	F	Rayf	G	Eis		L	Selec	4	A	Spic	W	Timk	1:1	4.84:1	Per	36x5	40x5†	Ross	128	Simp	Smi	Gdy					
Gary KT	7000	3850	Buda	4½x6	32.4	L	C	T	F	Mas	G	Eis		L	B-Li	4	A	Spic	W	Timk	10.33:1	41.33:1	S-El	36x5	40x5†	Ross	162	Pier	Pru						

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
3½ Ton—Continued																															
Giant 17	6800	3850	Cont	4½x5½	32.4	L	C	C	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Shel	10.85:1	49.61:1	Shel	36x5†	36x5†	Ross	176	Pier	.....	Wan	70
G.M.C. 71A	7540	3950	Cont	4½x5½	32.4	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	A	Own	W	Timk	12:1	58.6:1	Det	36x5†	40x5†	Jac	163	Mon	Own	SAE	75
G.M.C. 71B	7655	4025	Cont	4½x5½	32.4	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	A	Own	W	Timk	12:1	58.6:1	Det	36x5	40x5†	Jac	187	Mon	Own	SAE	75
Gramm-Bernstein 35	6900	4450	Hink	4½x5½	32.4	L	C	T	F	Strm	V	Eis	...	D	Own	4	A	Own	W	Stan	8.75:1	50.6:1	.....	36x5	40x5†	Ross	156	.....	.....	Fir	91.7
Hahn F	7000	....	.....	4½	32.4	L	C	Own	F	Strm	...	Bos	...	D	B-Li	4	....	Spic	W	Timk	.....	.....	.....	36x5	36x5†	Ross	Q	Pier	.....	.....	....
Hall	6100	3750	Cont	4½x5½	32.4	L	P	L	B	Zen	G	Bos	...	L	B-Li	..	A	K-B	W	Timk	10.33:1	.....	Det	36x5	36x5†	Gem	Q	Dup	Sim	.....	....
Harvey WHA	7700	4300	Buda	4½x6	32.4	L	P	T	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	Shel	36x5	36x5†	Ross	160	Dup	Smi	.....	60
Hendrickson J	....	3800	Buda	4¼x5¾	28.9	L	P	T	F	Strm	G	Dix	...	D	Full	4	A	Ther	W	Timk	10.33:1	49.6:1	Tut	36x5	36x5†	Ross	Q	Pier	.....	.....	80
Hewitt-Ludlow	6300	4000	Buda	4½x5½	28.9	...	...	.....	...	Strm	...	Bos	...	B	Cott	4	....	Spic	W	Wis	.....	.....	.....	36x5	36x5†	Ross	156	.....	.....	.....	....
Hurlburt	6400	4400	Buda	4½x6	32.4	L	C	T	B	Flch	G	Eis	...	D	B-Li	4	A	Spic	W	Flot	8.66:1	41.91:1	.....	36x5	36x5	Ross	152	Dup	Wan	.....	....
Indiana 35	6900	3600	Rut	4⅜x5½	30.6	L	C	T	F	Strm	G	Eis	...	B	Selec	4	A	Spic	W	½-Fl	10.25:1	49.6:1	S-El	36x5	36x5†	Wohl	160	Pier	Smi	.....	75
International L	5440	....	Own	4¼x5	28.9	O	T	Own	B	Ens	G	Dix	O	O	B-L	4	A	Own	I	Own	11:1	53.25:1	.....	36x5	40x10	Own	160	Own	Own	Fir	90
Kalamazoo K	7370	3900	Cont 6	3¾x5¼	33.8	L	P	Hvn	B	Strm	V	Bos	D	B	Full	4	A	Acme	W	Shel	10:1	.....	Shel	36x5	36x5†	Ross	160	Pier	Bim	.....	....
Kelly-Springfield K40	8285	4400	Own	4½x6½	32.4	T	P	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.48:1	31.6:1	Pier	36x5	40x5†	Gem	150	Pier	StM	.....	93
Kissel Heavy Duty	6840	3975	Own	4¼x5½	28.9	L	C	McC	S	Strm	V	Eis	...	W	Warn	4	A	Spic	W	Shel	11.75:1	58.6:1	Shel	36x5	36x5†	Ross	168	Pier	Smi	.....	80
Kleiber C	....	4400	Cont	4½x5½	32.4	...	...	.....	...	Strm	G	Bos	...	...	B-Li	..	A	.....	W	.....	8.75:1	35:1	.....	36x5	36x10	Ross	163	.....	W&L	.....	....
Larrabee-Deyo AB	6850	4000	Cont	4½x5½	32.4	L	C	Bus	S	Strm	G	Bos	...	L	B-Li	4	A	M	W	Shel	10.25:1	41:1	Mer	36x5	36x5†	Ross	172	Pier	Hoo	.....	....
Maccar M	6175	4300	Cont	4½x5½	32.4	L	C	Own	B	Strm	G	Bos	...	L	B-Li	3	U	Spic	W	Timk	8.75:1	35.08:1	Mer	36x5	36x5†	Ross	172	Pier	Day	Fir	70
Mack AC	7070	4950	Own	5 x6	40	L	C	Own	S	Zen	G	Dix	E	O	Selec	3	U	Spic	C	Dead	9.18:1	.....	Mer	36x5	40x5†	Gem	168	Own	Sch	.....	65
Master A	6900	3990	Buda	4½x6	32.4	L	C	T	B	Mas	G	Eis	...	B	B-Li	4	A	Spic	W	Timk	10.33:1	41.32:1	Det	36x5†	40x5	Ross	158	Pier	Pru	.....	72
Master AL	7200	4090	Buda	4½x6	32.4	L	C	T	B	Mas	G	Eis	...	B	B-Li	4	A	Spic	W	Timk	10.33:1	41.32:1	Det	36x5†	40x5	Ross	194	Pier	Smi	.....	72
Menominee G	....	4270	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Eis	...	F	Full	4	A	Spic	W	Timk	10.33:1	41.32:1	Tut	36x5	36x6†	Gem	160	Pier	Stn	Fir	80
Nelson & LeMoon F3½	6000	7280	Cont	4¼x6½	28.9	T	C	T	S	Strm	G	Bos	...	L	B-Li	4	U	Own	W	Timk	8.75:1	2:1	Tut	36x5	36x5†	Lav	Q	Mon	Pru	Gdy	80
Noble E70	6500	....	Buda	4½x6	32.4	...	C	T	...	Strm	G	Eis	...	F	Full	4	A	.....	W	Shel	8.75:1	.....	S-El	36x5	36x10	Lav	196	Pier	Bim	Fir	....
Northway B3	7260	4250	Own	4 x6	25.6	O	C	GO	B	Sheb	V	Bat	N	F	Full	4	U	Spic	N	Shel	10.25:1	49.2:1	Per	36x5	40x10	Ross	160	Pier	.....	.....	....
Old Reliable C	6650	4000	Wis	4¼x6	28.9	L	C	T	B	Strm	V	Bos	...	D	Full	4	A	Spic	W	Shel	8.75:1	42.5:1	Shel	34x5	36x5†	Ross	160	Mon	StM	.....	75
Oneida D9	....	3800	Own	.....	22.5	L	C	.....	...	.....	...	Mag	...	...	.....	4	...	.....	...	.....	.....	.....	S-El	36x5	36x10	.....	170	.....	.....	.....	....
Paige 51-18	7000	3950	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Bos	...	D	Selec	4	A	Spic	W	Timk	10.33:1	49.7:1	Per	36x5	36x5†	Jac	160	Simp	Day	.....	80
Parker J9	6800	4400	Wis	4½x6	32.4	L	C	Own	F	Strm	G	Bos	W	L	Warn	4	A	K-B	W	Own	7.8:1	38.92:1	S-El	38x7*	44x10	Ross	160	Mon	Bim	.....	80
Pioneer A	....	3290	Cont	4½x5½	32.4	...	C	.....	...	Strm	...	Eis	...	...	B-Li	4	....	.....	W	Timk	.....	.....	.....	36x5	36x5†	.....	160	.....	.....	.....	....
Republic 20	6400	3595	Cont	4½x5½	32.4	L	C	T	B	Strm	G	Eis	...	D	Full	4	U	K-B	I	Torb	10:1	48:1	S-El	36x5	36x10	Jac	165	Phar	Smi	.....	....
Rowe DEW	6520	3800	Wis	4¼x6	28.9	L	C	May	F	Zen	G	Bos	...	L	B-Li	4	U	M	W	Shel	8.75:1	12.75:1	Shel	36x5	36x5†	Ross	156	Simp	Hoo	.....	54
Sandow M	6500	3995	Cont	4½x5½	32.4	L	P	T	B	Strm	G	Bos	...	D	B-Li	4	A	K-B	W	Timk	10.33:1	42:1	GC	36x5	36x5†	Ross	175	Mon	Pru	.....	70
Sanford 35	6600	3975	Cont	4½x5½	42.3	L	P	T	F	Strm	G	Bos	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	13.15:1	S-El	36x5	36x5†	Ross	174	Pier	Hoo	Fir	75
Schacht	6500	4150	Buda	4¼x5½	28.9	L	P	Own	F	Sheb	G	Bos	...	H	Own	3	A	Flex	W	Own	10.33:1	32.31:1	Nat	36x5	36x5†	Own	168	Dup	StM	.....	70
Schwartz D	7000	4500	Buda	4½x6	32 4	L	P	Fed	B	Strm	...	Bos	...	L	B-Li	4	....	M	I	Torb	.....	.....	Row	36x6	36x6†	Ross	170	Dup	Sch	.....	....
Selden 3½A	7100	3990	Cont	4½x5½	32.4	L	P	Bus	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	8.25:1	42:1	Per	36x5	36x10	Gem	162	Pier	Arc	.....	70
Service 71	6930	4085	Buda	4¼x5½	28.9	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	8.75:1	42.3:1	.....	36x5	36x5†	Ross	171	Simp	Bim	.....	70
Service 76	7280	4285	Buda	4½x6	32.4	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	7.8:1	37.7:1	.....	36x5	36x5†	Ross	171	Simp	Bim	.....	70
Signal M	7070	4100	Cont	4½x5½	32.4	L	C	McC	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Timk	12:1	4.84:1	Det	36x5	40x5†	Lav	168	Pier	Hay	Gdy	80
Standard 66	6480	3675	Cont	4½x5½	32.4	L	C	T	B	Strm	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.33:1	41.4:1	.....	36x5	36x5†	Gem	160	Mon	.....	.....	75
Sterling 3½	8300	4550	Ster	4¼x6¼	32.4	L	P	Own	S	Rayf	V	Eis	...	M	Own	4	....	Spic	W	Timk	8.75:1	39.5:1	Math	36x5	40x5†	Ross	162	Wau	.....	.....	92
Stewart 10	6080	3500	Cont	4½x5½	32.4	L	P	.....	B	Zen	G	Eis	...	F	Full	4	U	Hart	I	.....	10:1	48:1	Det	36x5	36x5†	Ross	165	Pier	Cla	Fir	80
Tiffin PW	6850	3980	Cont	4½x5½	32.4	L	C	T	S	Sheb	G	Bos	...	F	Full	4	A	Acme	W	Shel	8.7:1	41.7:1	Kal	36x5	36x5†	Ross	160	Pier	Smi	Gdy	80
Titan	7350	4300	Buda	4½x6	32.4	L	C	T	F	Strm	G	Eis	...	D	Cott	4	A	.....	I	Cl	9:1	48:1	Math	36x5	40x5†	Lav	162	Simp	.....	.....	70
Tower G3½	6800	4100	Cont	4½x5½	32.4	L	C	T	S	Strm	G	Bos	...	F	Full	4	U	Spic	W	Timk	10 33:1	50:1	Det	36x5	36x5†	Ross	165	Pier	.....	.....	70
Twin City 4 Wheel D-B	7200	4750	Wis	5½x6	42	T	C	H	B	Strm	G	K-W	...	M	Cott	3	A	.....	I	½-Fl	.....	.....	.....	36x6	36x6	Ross	140	Pier	Arc	SAE	60
United C	....	3600	Buda	4½x5½	28.9	L	C	.....	F	Strm	G	Eis	Q	L	B-Li	4	A	Bld	I	Cl	10:1	.....	.....	36x5	36x5†	Ross	160	Simp	Cla	Fir	80
U. S. J	7000	3950	Cont	4½x5½	32.4	L	C	T	S	Strm	G	Eis	...	H	B-Li	4	A	Opt	W	Shel	10.75:1	49.6:1	Shel	36x5	40x5†	Lav	162	Pier	Sch	.....	80
Velie 26B	7400	3900	Cont	4½x5½	32.4	L	C	T	B	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Timk	10.33:1	49.88:1	Math	36x5	36x5†	Gem	174	Pier	Bim	Gdy	80
Victor M	6600	3800	Cont	4½x5½	32.4	L	C	Own	B	Strm	...	Bos	...	L	B-Li	4	....	Spic	W	Timk	.....	.....	S-El	36x6	36x5†	Gem	176	.....	.....	.....	....
Ward LaFrance 3½A	5800	3900	.....	4½x5½	32.4	L	C	Own	S	Zen	G	Mag	...	B	B-Li	4	A	Spic	W	Wis	9:1	43.56:1	.....	36x5	40x5†	Ross	170	Simp	.....	.....	85
Wichita O	6500	3750	Wau	4½x5¾	32.4	...	C	EM	C	Strm	...	Bos	...	C	B-Li	4	....	Own	W	Shel	.....	.....	.....	36x5	36x5†	Ross	165	Wau	.....	.....	....
Wilcox P	6300	....	Own	4¼x5	28.9	L	C	T	S	.....	G	Bos	...	C	Selec	4	A	Own	W	½-Fl	11.75:1	57.1:1	Shel	36x6	35x5†	Own	139	Pier	Smi	.....	....
Wilson G	6800	3950	Cont	4½x5½	32.4	L	C	T	B	Mar	G	Eis	...	D	Warn	4	A	K-B	W	Timk	8.75:1	43.66:1	Tut	36x5	36x5†	Ross	160	Pier	.....	.....	80
Winther 479	7700	4900	Wis	4¼x6	28.9	L	P	T	G	Mas	V	Eis	B	B	Full	4	A	Bld	I	Cl	10:1	48:1	Math	36x5	36x5†	Ross	158	.....	Own	Fir	65
4 Ton																															
Bessemer K2	6740	3985	Cont	4½x5½	32.4	L	C	C	B	Rayf	...	Bos	...	B	B-Li	4	....	Spic	I	Torb	.....	.....	Per	36x5	36x10†	Ross	175	Pier	.....	.....	75
Gabriel F	5800	4300	Buda	4½x6	32.4	L	T	T	F	Rayf	G	Bos	L	B	B-Li	4	A	Spic	W	Timk	10.5:1	1:1	Mer	36x5	40x10	Gem	180	Dup	Smi	Smi	65
Highway-Knight	7400	4800	.....	4 x 6	25.6	...	T	Own	F	Zen	V	Mag	...	...	.....	4	A	.....	W	.....	8.75:1	42.35:1	.....	36x5	36x5†	.....	159	.....	Sch	.....	....
Kelly-Springfield K45	8730	4550	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	10.71:1	32.3:1	Per	36x5	40x6†	Gem	150	Pier	StM	.....	93
Kimball E	....	....	Wis	5.1x5½	41.9	T	C	Flex	F	Zen	V	Ber	...	L	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	US	36x5	40x10	Ross	Q	Dup	Smi	.....	80
King Zeitler	6500	4200	Cont	4½x5½	32.4	L	G	T	B	Strm	...	Bos	...	L	B-Li	4	....	Ther	W	Timk	.....	.....	Mer	36x5	40x5†	Lav	180	Pier	.....	.....	80
Moreland 19G	7810	4875	Cont	4¾x6	36.1	L	C	C	B	Mill	...	Dix	...	D	Selec	4	....	Ther	W	Timk	.....	.....	US	36x5	40x5†	Ross	162	Cont	Smi	.....	....
Noble WW4	7170	3950	Cont	4½x5½	32.4	L	C	T	B	Strm	...	Eis	...	D	Full	4	....	Acme	W	Shel	.....	.....	Kal	36x5	36x5†	Ross	168	Pier	.....	.....	80
Packard 4E	7460	4550	Own	4½x5½	32.4	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	10:1	46:1	.....	36x5	40x5	Own	156	Own	.....	.....	55
Riker BB	7200	4700	Own	4¼x6	28.9	T	C	T	B	B&B	G	Ber	W	C	Selec	4	A	Own	W	Own	10:1	42.5:1	.....	36x5	36x6†	Ross	150	Own	.....	.....	77
Union H	6600	3500	Wis	4½x6	28.9	L	P	GO	F	Sheb	G	Eis	...	F	Full	4	U	UP	I	Torb	10.25:1	49.2:1	Math	36x6	36x10	Ross	171	Dup	Smi	.....	75
Winther 89	7600	4200	Wis	4¼x6	28.9	L	P	T	G	Mas	...	Eis	B	B	B-Li	4	A	Bld	I	Cl	12.5:1	60.5:1	Math	36x5	40x5†	Ross	156	.....	Cla	.....	80

5 Ton

Acason M.	8350	5150	Wau	4¾x6¾	36.1	L	P	Can	S	Strm	V	Eis	...	B	Cott	3	U	Bld	W	Timk	10.25:1	48.5:1	Det	36x6	40x6†	Ross	187	Wau	Smi	.....	77
Acme E.	8860	4975	Cont	4¾x6	36.1	L	C	GO	F	Rayf	V	Eis	...	B	Cott	3	A	Bld	W	Timk	11.66:1	46.6:1	Det	36x6	40x6†	Ross	180	Cont	Smi	Stn	80
Atterbury 8E.	9635	4975	Cont	4¾x6	36.1	L	C	G	F	Zen	V	Eis	...	L	B-Li	4	A	Spic	W	Timk	11.6:1	56.14:1	SP	36x5	40x6†	Gem	167	Cont	Day	.....	98
Available H5.	8900	....	Cont	4¾x6	36.1	L	C	T	B	Strm	V	Bos	...	L	B-Li	4	A	Spic	W	Timk	11.66:1	56.4:1	Tut	36x6	40x6†	Ross	190	Cont	Sch	.....	75
Brockway T.	8800	5000	Cont	4¾x6	36.1	L	C	Bus	F	Strm	V	Eis	...	L	B-Li	4	A	Spic	W	Timk	11.66:1	46.75:1	Mer	36x6	40x6†	Gem	174	Dup	Smi	.....	70
Clydesdale 120B.	8500	4975	Cont	4¾x6	36.1	L	C	T	F	Strm	V	Eis	...	L	B-Li	4	A	Spic	W	Timk	11.66:1	56.5:1	Stan	36x5	40x6†	Ross	176	Own	Smi	.....	76
Corbitt AA.	8000	5000	Cont	4¾x6	36.1	L	C	McC	F	Strm	V	Eis	...	D	B-Li	4	A	Bld	W	Shel	10.25:1	49.61:1	Shel	36x6	40x6†	Ross	178	Cont	Smi	.....	75
Couple Gear AC.	11000	6700	Wis	5¼x7	44.1	T	G	H	F	Strm	G	Eis	O	...	Own	5	....	Own	B	Own	25.1	....	Tut	36x5†	36x5†	Own	144	.....	Own	Own	60
Day-Elder E.	8200	4500	Buda	4½x6	32.4	L	P	Bus	F	Zen	G	Eis	...	D	B-Li	4	A	Hart	W	Shel	10.25:1	49.6:1	Shel	36x5	40x6†	Ross	170	Mon	Jon	Stn	73
Denby 210.	8590	4900	Cont	4½x5½	32.4	L	C	L	B	Strm	G	Eis	...	D	Warn	4	A	UP	I	Cl	12.55:1	62.62:1	Det	36x6	40x12	Ross	170	Simp	Cla	.....	80
Diamond T-R.	7920	5190	......	4½x5½	32.4	L	C	T	B	Strm	G	Bos	...	...	......	4	A	Spic	W	......	13.66:1	66.14:1	Math	36x6	40x6†	......	170	Pier	......	.....	....
Diamond T-S.	8790	5660	......	4¾x6	36.1	L	C	T	B	Strm	G	Bos	...	...	......	4	A	Spic	W	......	11.66:1	56.43:1	Math	36x6	40x6†	......	180	Pier	......	.....	....
Fageol 5300.	8300	....	Wau	4½x6¼	32.4	L	C	Spi	S	Zen	V	Dix	...	B	Selec	5	A	Spic	W	Timk	....	89:1	Math	36x6	40x6†	Ross	172	Wau	Pru	.....	80
Federal X.	8200	4500	Cont	4½x5½	32.4	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	13.66:1	86.16:1	Math	36x6	40x6†	Gem	156	Phar	Smi	.....	77.5
Garford 68.	8870	5000	Wis	4¾x5½	36.1	T	C	T	F	Rayf	G	Eis	...	L	Selec	4	A	Spic	C	Dead	1:1	4:1	Per	36x6	40x6†	Ross	128	Simp	Smi	Gdy	....
Gary M.	8500	4850	Buda	5 x6½	40	L	C	T	F	Mas	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	11.66:1	56.43:1	S-El	36x6	40x6†	Ross	182	Pier	Day	.....	....
G.M.C. 101A.	8485	4550	Cont	4½x5½	32.4	L	C	McC	B	Mar	G	Eis	...	L	Selec	4	A	Own	W	Timk	13.6:1	66.7:1	Det	36x6†	40x6†	Lav	163	Mon	Own	SAE	75
G.M.C. 101B.	8655	4625	Cont	4½x5½	32.4	L	C	McC	B	Mar	G	Eis	...	D	Selec	4	A	Own	W	Timk	13.6:1	66.7:1	Det	36x6†	40x6†	Lav	187	Mon	Own	SAE	75
Gramm-Bernstein 50.	9500	5500	Cont	4¾x6	36.1	L	C	T	F	Strm	V	Eis	...	C	Own	4	A	Own	W	Stan	9.50:1	55:1	......	36x6	40x6†	Ross	168	.....	......	Fir	92.2
Hahn FE.	9000	....	......	4¾	....	L	C	Own	F	Strm	...	Bos	...	D	B-Li	4	....	Spic	W	Timk	....	....	......	36x6	40x6†	Ross	Q	.....	......	.....	....
Hall.	7400	4850	Cont	4½x5½	32.4	L	T	L	B	Zen	G	Bos	...	L	B-Li	..	A	K-B	W	Timk	13.66:1	....	Per	36x4	40x6†	Gem	Q	Dup	Smi	.....	....
Harvey WKA.	8900	5000	Buda	4½x6	32.4	L	P	T	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	Shel	36x6	40x6†	Ross	160	Dup	Smi	.....	60
Hendrickson K.	....	5000	......	5 x6	40	...	C	.....	F	Strm	G	.....	...	D	A	4	....	......	...	Timk	11.66:1	57:1	S-El	36x6	40x6†	Ross	Q	.....	......	.....	....
Hewitt-Ludlow.	8000	5100	Buda	4½x6	32.4	...	...	.....	...	Strm	...	Bos	...	B	Cott	4	....	Spic	C	......	....	....	......	36x6	40x6†	Lav	168	.....	......	.....	....
Highway-Knight.	....	5600	......	4 x6	25.6	...	T	Own	F	Zen	V	Mag	...	...	......	4	A	......	W	......	10.2:1	49.4:1	......	36x5	40x6†	......	159	.....	Sch	.....	....
Hurlburt.	7800	5250	Buda	4½x6	32.4	L	C	T	B	Flch	G	Eis	...	D	B-Li	4	A	Spic	W	Flot	10.66:1	49.99:1	......	36x5	40x6†	Ross	156	Dup	Wan	.....	....
Indiana L.	8300	4600	Wau	4¾x6¾	36.1	L	C	T	S	Strm	G	Eis	...	B	Selec	4	A	Spic	W	½-Fl	8.75:1	42.35:1	S-El	36x5	40x6	Wohl	167	Wau	Smi	.....	78.5
Kelly-Springfield K50.	9175	5150	Own	4½x6½	32.4	T	C	Fed	S	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	12.24:1	44.5:1	Per	36x6	40x6†	Gem	150	Pier	StM	.....	93
Kimball F.	....	....	Wis	5⅛x6	42	T	C	Flex	F	Zen	V	Ber	...	L	B-Li	4	A	Spic	W	Shel	8.75:1	42.35:1	US	36x6	40x12	Ross	Q	Dup	Smi	.....	80
Kissel Goliath.	7500	4785	Own	4¼x5½	28.9	L	C	McC	S	Strm	V	Eis	...	W	Warn	4	A	Spic	W	Shel	11.66:1	65:1	Shel	36x6	36x6†	Ross	180	Pier	Smi	.....	75
Kleiber D.	....	5300	Cont	5¼x5¾	44.1	...	..	.....	...	Strm	G	Bos	...	...	B-Li	..	A	......	W	......	10.33:1	41.2:1	......	36x6	40x6	Ross	180	.....	Smi	.....	....
Larrabee-Deyo T.	8500	4850	Cont	4½x5½	32.4	L	C	Bus	S	Strm	G	Bos	...	L	B-Li	4	A	M	W	Shel	11.75:1	57:1	Mer	36x6	40x6†	Ross	176	Pier	Hoo	.....	....
Master B.	8000	4990	Buda	4¾x6½	36.1	L	C	T	B	Mas	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.25:1	49.61:1	Det	36x6†	40x6†	Ross	170	Pier	Smi	.....	72
Master BL.	8200	5090	Buda	4¾x6½	36.1	L	C	T	B	Mas	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	10.25:1	49.61:1	Det	36x6†	40x6†	Ross	194	Pier	Smi	.....	72
Menominee J.	....	5450	Wis	4¾x5½	36.1	T	C	T	B	Strm	G	Eis	...	F	B-Li	4	A	Spic	W	Timk	13.66:1	....	Tut	36x6	40x6†	Ross	160	Mon	Stn	Fir	80
Moreland 19J.	9000	5350	Cont	4¾x6	36.1	L	C	Own	F	Mill	G	Dix	...	D	Selec	4	A	Ther	W	Timk	10.25:1	49.61:1	US	36x6	40x6†	Ross	192	Cont	Smi	SAE	....
Nelson & LeMoon F5.	8000	4750	Buda	4½x6	32.4	L	C	T	F	Strm	G	Bos	W	L	B-Li	4	A	Own	W	Timk	11.66:1	2:1	Tut	36x6	40x6†	Lav	Q	Pier	Pru	Gdy	80
Old Reliable D.	8400	5000	Wis	5.1x5½	41.9	T	C	T	B	Strm	V	Bos	...	W	D-Sea	4	A	Spic	W	Shel	8.75:1	41.5:1	Shel	36x5	40x6†	Ross	168	Q	StM	.....	80
Oneida E9.	....	4850	Own	....	33.5	O	C	.....	...	.....	...	Mag	...	...	Own	4	....	......	...	......	....	....	S-El	36x6	40x12	......	180	.....	......	.....	....
Packard 5-E.	8650	5450	Own	5 x5½	40	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	10.66:1	49:1	......	36x6	40x6	Own	156	Own	......	.....	57.2
Parker M9.	8450	5500	Cont	4¾x6	36.1	L	C	Own	F	Strm	V	Bos	W	L	Warn	4	A	K-B	W	Timk	10.25:1	51.15:1	S-El	36x6	40x6†	Ross	160	Cont	Bim	.....	80
Pierce-Arrow R9.	8200	5500	Own	4⅞x6	38.1	T	P	T	F	Strm	G	Dix	...	C	Selec	3	A	Own	W	Flot	7.8:1	29.5:1	S-El	36x5	40x6†	Own	168	Own	Own	Own	85
Pioneer J.	....	3990	Cont	4½x5½	32.4	...	C	.....	...	Strm	...	Eis	...	...	B-Li	4	....	......	W	Timk	....	....	......	36x6	40x6†	......	170	.....	......	.....	....
Rowe FW.	8350	4900	Wis	4¾x5½	36.1	T	C	May	F	Zen	G	Bos	...	L	B-Li	4	A	M	W	Shel	8.75:1	13.59:1	Shel	36x6	40x6	Ross	171	Simp	Hoo	.....	57
Royal.	....	5000	Wis	4¾x5½	36.1	T	C	T	...	Strm	...	Bos	Q	...	Own	..	....	Own	W	Timk	....	....	Mer	36x6	42x6†	Ross	168	Mon	......	.....	....
Sandow L.	7800	4775	Cont	4½x5½	32.4	L	P	T	B	Strm	...	Bos	...	D	B-Li	4	....	K-B	W	Timk	....	....	GC	36x6	40x6†	Ross	175	Mon	......	.....	70
Sanford 50.	7400	4750	Cont	4½x5½	32.4	L	P	T	F	Strm	G	Bos	...	B	B-Li	4	A	Spic	W	Shel	11.7:1	16.69:1	S-El	36x5	40x6†	Ross	174	Pier	Hoo	Fir	75
Schacht.	8000	5150	Buda	4½x6	32.4	L	P	Own	F	Sheb	G	Bos	...	D	Own	8	A	Flex	W	Own	10.33:1	70:1	Nat	36x5	40x6†	Own	168	Dup	StM	.....	70
Selden DL.	8800	5000	Cont	4½x5½	32.4	L	P	Bus	B	Strm	G	Eis	...	L	B-Li	4	A	Spic	W	Timk	10.25:1	49.2:1	Per	36x6	40x12	Ross	170	Pier	Smi	.....	70
Service 101.	8760	5145	Buda	4½x6	32.4	L	C	T	F	Strm	G	Eis	...	D	Selec	4	A	Spic	W	Timk	10.25:1	49.6:1	......	36x6	36x6†	Ross	171	Simp	......	.....	75
Signal R.	8200	5100	Cont	4¾x6	36.1	L	C	McC	B	Strm	G	Eis	...	B	B-Li	4	A	Spic	W	Timk	....	....	Det	36x6	40x6†	Ross	180	Pier	Smi	Gdy	80
Standard 86.	8000	4650	Cont	4¼x5½	32.4	L	C	T	B	Strm	V	Eis	...	D	B-Li	4	A	Spic	W	Timk	11.6:1	39.79:1	......	36x6	40x6†	Gem	160	Mon	......	.....	75
Sterling 5-Worm.	9600	5350	Ster	5x6¼	40	L	C	Own	P	Rayf	V	Eis	...	M	Own	3	A	Spic	W	Timk	8.80:1	60.7:1	Math	36x6	40x6†	Ross	168	Wau	Smi	Gdy	92
Sterling 5-Chain.	10200	5600	Ster	5x6¼	40	L	C	Own	P	Rayf	V	Eis	...	M	Own	6	A	UM	C	Own	7.04:1	42.5:1	Math	36x6	40x6†	Ross	174	Wau	Wan	.....	90
Tiffin.	8400	5000	Cont	3¾x5¼	33.8	L	C	T	B	Sheb	...	Bos	W	D	Covt	3	....	Acme	W	Shel	8.7:1	....	Kal	36x6	40x6†	Ross	168	.....	......	.....	80
Titan.	9100	5150	Buda	4½x6	32.4	L	P	T	F	Strm	G	Eis	...	D	Cott	4	A	......	I	Cl	11:1	59:1	Shel	36x5	40x6†	Lav	156	Simp	......	.....	70
Twin City 4-Wheel Drive.	8000	5250	Wis	5⅜x6	46.2	T	C	H	B	Strm	G	K-W	...	M	Cott	3	A	......	I	½-Fl	....	....	......	36x7	....	Ross	140	Pier	SAE	.....	60
United V.	....	4600	Buda	4½x6	32.4	L	C	.....	F	Strm	G	Eis	Q	L	B-Li	4	A	Bld	I	Cl	....	....	......	36x5	40x6†	Ross	160	Simp	Cla	Fir	80
U.S.K.	8500	4850	Wau	4¾x6¾	36.1	L	C	T	F	Strm	G	Eis	...	...	Cott	3	A	Q	W	Shel	8.75:1	34.81:1	......	36x5	40x6†	Lav	168	Wau	Smi	.....	80
Vim 24.	8000	....	Her	4¼x5½	28.9	L	C	McC	C	Zen	G	Dix	...	D	Selec	4	A	Spic	W	Shel	....	....	Shel	36x5	40x6†	Gem	150	Dup	Smi	.....	....
Walter S.	8000	....	Wau	4½x6¼	50	L	P	T	F	Strm	...	Bos	W	D	Warn	4	....	M	I	Own	....	....	S-El	36x6	40x6†	Ross	168	Own	......	.....	80
White 45.	7925	5000	Own	4¼x5¾	28.9	L	C	T	F	Own	V	Mag	...	D	Selec	4	U	Own	R	Own	....	....	......	36x6	40x6	Own	174	Own	......	.....	70
Wilcox W.	9000	....	Wau	4¾x6¾	36.1	L	C	T	S	......	V	.....	...	C	Selec	4	A	Spic	W	½-Fl	10.25:1	45.1:1	Shel	36x5	40x12	Gem	162	.....	Smi	.....	....
Wilson H.	7500	4800	Cont	4½x5½	32.4	L	C	T	B	Mas	G	Eis	...	D	Warn	4	A	K-B	W	Timk	10.5:1	52.39:1	Tut	36x6	40x6†	Ross	160	Pier	......	.....	80
Winther 109.	8300	5000	Wis	4½x6	32.4	L	C	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	12.5:1	60.5:1	Math	36x5	40x6†	Ross	162	Dup	Cla	.....	80

5½, 6 and 7 Ton

Doane 1919.	8500	5825	Wau	4¾x6¾	36.1	L	C	C	S	Mas	G	Bos	...	D	Selec	3	U	D	C	Dead	10.6:1	....	......	36x6	40x6†	Lav	178	Wau	West	.....	79
Hall.	8000	4850	Cont	4½x5½	32.4	L	P	L	B	Zen	G	Bos	...	...	B-Li	..	U	K-B	W	Timk	12:1	....	Det	36x5	40x6†	Gem	Q	Dup	Smi	.....	....
Mack AC5½.	8650	5500	Own	5 x6	40	L	C	T	S	Zen	G	Dix	E	O	Selec	3	UJ	Spic	C	Own	9.1:1	28.89:1	Mer	36x6	40x6†	Gem	168	Own	Sch	.....	68
Garford 69.	9350	5300	Wis	5.1x5½	41.9	T	C	T	F	Rayf	...	Eis	...	L	Selec	4	....	Spic	C	Dead	....	....	Per	36x6	40x7†	Ross	128	Simp	......	.....	....
Kelly-Springfield K60.	9500	5500	Own	4½x6½	32.4	T	C	Fed	F	Rayf	G	Eis	W	C	Covt	3	A	Own	C	Dead	12.39:1	45.2:1	Per	36xx6	40x7†	Gem	150	Own	StM	.....	93
Maccar G.	8750	5250	Cont	4¾x6	36.1	L	C	Own	B	Zen	G	Bos	...	L	B-Li	4	A	Spic	W	Timk	10.25:1	49.61:1	Mer	36x5	40x6†	Ross	186	Cont	Day	Fir	70
Packard 6E.	8925	5700	Own	5 x5½	40	L	C	T	F	Own	P	Dix	B	D	Selec	4	A	Spic	W	Flot	10.66:1	49:1	......	36x6	40x7	Own	156	Own	......	.....	58.5
Royal 6.	....	5400	Wis	5⅛x6	42	...	C	T	...	Strm	...	Bos	Q	...	Own	..	....	Own	W	Timk	....	....	Mer	36x6	40x6†	Ross	168	Mon	......	.....	....
Tiffin 6.	9000	5200	Cont 6	3¾x5¼	33.8	L	C	T	B	Sheb	G	Bos	W	D	Covt	3	A	Acme	W	Shel	10.25:1	60.7:1	Kal	36x6	40x12	Ross	168	.....	Smi	Gdy	80
Winther 129.	9000	5250	Wis	4¾x6	36.1	T	C	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	12.5:1	60.5:1	Math	36x6	40x6	Ross	162	Dup	......	.....	80
Winther 149.	9600	5500	Wis	5⅛x6	42	T	C	T	G	Mas	V	Eis	B	B	B-Li	4	A	Bld	I	Cl	12.5:1	60.5:1	Math	36x6	40x7	Ross	162	Dup	......	.....	80
Couple Gear LO6.	12000	7350	Wis	5¼x7	44.1	T	G	H	F	Strm	G	Eis	O	...	Own	5	....	Own	B	Own	12:1	....	Tut	36x5†	36x6	Own	144	.....	Own	Own	65
Mack AC7½.	9050	6000	Own	5 x6	40	L	C	Own	S	Zen	G	Dix	E	O	Selec	3	UJ	Spic	C	Dead	11.58:1	37.16:1	Mer	36x7	40x7†	Gem	168	Own	Sch	.....	73
Old Reliable K,L,M.	10240	6000	Wau	4¾x6¾	36.1	L	C	T	B	Strm	G	Bos	...	W	D-Sea	4	A	Spic	W	Shel	10.86:1	50.9:1	Shel	36x6	40x7†	Ross	136	Wau	Smi	.....	78

Model	Chassis Weight	Chassis Price	Engine—4 Cyl. unless otherwise noted	Bore and Stroke	Horsepower	Valve Arrange't	How Cooled	Radiator Make or Type	Lubrication	Carburetor	Fuel Feed	Ignition System	Engine Starter	Clutch	Transmission	Speeds Forward	Location of Transmission	Universal	Final Drive	Rear Axle	Total Gear Reduction in High	Total Gear Reduction in Low	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Governor	Wheels—Make	Rim Equipment	Pr. Cent of Weight on Rear Wheels
5½, 6 and 7 Ton—Continued																															
Royal 7	....	....	Wis	5¼x7	44.1	...	C	T	...	Strm	...	Bos	Q	...	Own	..	A	.....	W	Timk	.....	.....	Mer	36x7	40x7†	Ross	168	Mon	.....	.....	....
Sterling 7½-Chain	....	6000	Ster	5x6¼	40	L	C	Own	R	Rayf	V	Eis	...	M	Own	6	....	UM	C	Own	.....	.....	Math	36x6	40x7†	Ross	174	Wau	Smi	.....	91
Wichita S	9200	5400	Beav	4½x6	32.4	O	P	EM	C	Strm	G	Ber	...	C	Own	4	A	Own	...	Own	13:1	4.78:1	.....	36x6	40x6†	Ross	165	Dup	Smi	.....	90
Gasoline Tractor-Trucks																															
Columbia T	4000	2350	Cont	4 1/16x5¼	27.2	L	C	T	B	Shk	...	Dix	...	C	Covt	3	....	Spic	I	Russ	.....	.....	Per	36x4	36x6	Own	112	Pier	.....	.....	....
Federal Light Duty	4100	2950	Cont	4 1/16x5¼	27.2	L	C	T	B	Zen	G	Eis	...	B	Own	4	A	Spic	W	Timk	9.25:1	40.7:1	Math	36x4	36x7	Gem	110	Phar	.....	.....	....
Federal Heavy Duty	6800	3775	Cont	4½x5½	32.4	L	C	T	B	Zen	G	Eis	...	B	Own	4	....	Spic	W	Timk	12:1	59.88:1	Math	36x5	36x5†	Gem	114	Phar	.....	.....	70
Garford 70BT	4750	3090	Buda	4¾x5½	28.9	L	C	T	S	Rayf	...	Spl	...	L	Selec	4	....	Spic	W	Timk	.....	.....	Per	36x4	36x7	Ross	119	Simp	.....	.....	....
Garford 77KT	6990	4400	Wis	4¾x5½	36.1	T	C	T	S	Rayf	...	Eis	...	L	Selec	4	....	Spic	W	Timk	.....	.....	Per	36x5	40x5†	Ross	105	Simp	.....	.....	....
Garford 68CT	8450	5100	Wis	5.1x5½	41.9	T	C	T	F	Rayf	...	Eis	...	L	Selec	4	....	Spic	C	Dead	.....	.....	Per	36x6	40x6†	Ross	102	Simp	.....	.....	....
Hewitt-Ludlow 6-Ton	4000	3300	Buda	4¼x5½	28.9	..	..	T	F	Strm	...	Bos	...	B	.....	..	..	Spic	C	.....	.....	.....	.....	36x5	36x4†	Lav	...	.....	.....	.....	....
Hood	2900	1300	Own	3¾x3¾	22.5	T	C	T	S	Holl	G	.....	...	D	Plan	2	U	Own	C	Own	8:1	24:1	Lah	20x3½	20x5	Own	60	.....	Own	.....	65
Jumbo D	4450	2700	Buda	4¼x5½	28.9	L	C	GO	F	Zen	...	Eis	...	F	Full	3	....	Arv	I	Cl	.....	.....	Det	36x4	36x7	Jac	152	Dup	.....	.....	60
Knox 35	8500	5500	Own	5 x5½	40	O	C	Fed	F	Zen	V	Mag	G	D	Selec	3	A	.....	W	Timk	1:.08	1:.0145	.....	36x4	38x6†	Ross	108	.....	Wan	.....	60
Knox 36 3-Ton	10000	6000	Own	5 x5½	40	O	C	Fed	F	Zen	V	Mag	G	D	Selec	3	A	.....	W	Timk	1:.08	1:.0145	.....	36x4	38x6†	Ross	108	.....	Wan	.....	....
Koehler MT	4750	3095	Her	4 x5⅛	25.6	L	C	T	P	Zen	...	Eis	...	D	B-Li	4	....	Spic	W	Timk	.....	.....	Math	36x4	36x7	Lav	142	Simp	.....	.....	....
Kuhn	9000	5000	Wis	4¼x5½	28.9	T	C	H	S	Rayf	...	Bos	...	C	Selec	4	....	.....	B	Own	.....	.....	.....	36x7	36x7	.....	138	.....	.....	.....	....
Lapeer 3-Ton	3050	2000	Wau	3½x5¼	19.6	L	P	.....	B	.....	...	Mag	...	D	Selec	3	....	.....	I	Torb	.....	.....	.....	34x3½	34x5	Ross	88	.....	.....	.....	55
Lapeer 5-Ton	3400	2700	Wau	4 x5¾	25.6	L	P	.....	B	.....	...	Mag	...	D	Selec	3	....	.....	I	Torb	.....	.....	.....	34x3½	34x3†	Ross	88	.....	.....	.....	....
Lombard	8000	....	Spec 6	5½x6¾	72.7	...	C	Spec	F	Sheb	P	.....	...	D	Spec	..	A	.....	...	W	.....	.....	.....	.....	.....	Spec	...	.....	.....	.....	90
Mack AB 5-Ton	4940	3400	Own	4 x5	25.6	L	C	Own	S	Zen	G	Dix	E	L	B-Li	4	UJ	Spic	C	Own	10.53:1	42.27:1	Mer	36x4	36x4†	Gem	120	Own	Sch	.....	....
Mack AC 7-Ton	7670	4950	Own	5 x6	40	L	C	Own	S	Zen	G	Dix	E	O	Selec	3	UJ	Spic	C	Dead	10.76:1	34.60:1	Mer	36x5	40x5†	Gem	119	Own	Sch	.....	....
Mack AC 11-Ton	8250	5500	Own	5 x6	40	L	C	Own	S	Zen	G	Dix	E	O	Selec	3	UJ	Spic	C	Dead	11.58:1	37.16:1	Mer	36x6	40x6†	Gem	119	Own	Sch	.....	....
Mack AC 15-Ton	8650	6000	Own	5 x6	40	L	C	Own	S	Zen	G	Dix	E	O	Selec	3	UJ	Spic	C	Dead	14.10:1	45.26:1	Mer	36x7	40x7†	Gem	119	Own	Sch	.....	....
Rennoc 8-Ton	5050	2850	Buda	4¼x5½	27.2	L	C	T	F	Strm	...	Spl	...	D	Warn	4	....	Hart	W	Wis	.....	.....	Row	36x5	36x7	Lav	116	Pier	.....	.....	60
Watson	6500	4050	Cont	4½x5½	32.4	L	C	Jam	B	Strm	...	Bos	...	L	B-Li	4	....	Spic	W	Timk	.....	.....	Shel	34x4	36x5	Gem	80	Pier	.....	.....	37

E. C. M. Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Pr. Cent of Weight on Rear Wheels
Electric Commercial Cars																	
Ward WS	750	1400	.....	12	Edis	45	West	West	4	B	Timk	Shel	32x2½	32x3	Own	88	60
C-T ½	1000	1800	1900	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3	36x3	W	90	60
Walker M	1000	2300	.....	15	Opt	60	West	West	5	O	Own	Math	34x3	36x3½	Ross	93	66
Atlantic 1C	2000	2770	.....	12	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x4	Ross	103	65
Ward WA	1250	2730	.....	12	Edis	47	G-E	G-E	4	W	Shel	Shel	32x3	34x3½	Own	90	60
C-T 1	2000	2500	2300	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3½	36x4	W	100	60
Walker K	2000	2500	.....	14	Opt	60	West	West	5	O	Own	Math	34x3½	36x4	Ross	96	66
Ward WB	2000	3250	.....	10	Edis	43	G-E	G-E	4	W	Shel	Shel	34x3½	36x4	Own	102	60
Atlantic 2C	4000	3590	.....	11	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x1†	Ross	115	65
C-T 2	4000	3500	2700	12	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x4	36x4†	W	115	60
Walker L	4000	3700	.....	13	Opt	60	West	West	5	O	Own	Math	38x4	38x6	Ross	112	66
Ward WD	4000	4500	.....	8.5	Edis	35	G-E	G-E	4	W	Shel	Shel	36x4	38x5†	Own	114	60
Atlantic 3C	7000	5220	.....	10	Opt	.....	G-E	G-E	5	C	Timk	.....	36x5	40x5†	Ross	135	65
C-T 3½	7000	5000	3950	11	Opt	50	G-E	Own	4	I	Dead	Shel	36x6†	36x4	W	122	55
Ward WF	7000	6600	.....	7	Edis	30	G-E	G-E	4	W	Shel	Shel	36x5	36x5	Own	132	60
Atlantic 5C	10000	6230	.....	9	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x5†	Ross	144	65
Couple Gear H	7000	9000	4800	10	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5†	Own	96	55
Couple Gear	10000	10000	5250	7	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5†	Own	96	75
C-T 5	10000	6000	4400	9	Opt	50	G-E	Own	4	I	Dead	Shel	36x7	36x5†	W	132	55
Walker P	7000	5300	.....	11	Opt	50	West	West	5	O	Own	Math	36x5	38x5†	Ross	131	66
Walker N	10000	6300	.....	10	Opt	50	West	West	5	O	Own	Math	36x6	38x6†	Ross	141	66
Ward WH	10000	8375	.....	6	Edis	26	G-E	G-E	4	W	Shel	Shel	36x7	40x10	Own	144	60
Atlantic 6C	13000	6940	.....	8	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x6	Ross	156	65
Couple Gear	14000	11000	5900	10	Phil	30	Own	Own	5	B	Own	Tut	36x5†	36x5	Own	96	55

Manufacturers Whose Models Are Included in Specifications on Preceding Pages

Acason—Acason Motor Truck Co., Detroit, Mich.
Ace—American Motor Truck Co., Newark, Ohio.
Acme—Acme Motor Truck Co., Cadillac, Mich.
All-American—All-American Truck Co., Chicago, Ill.
Apex—Hamilton Motors Co., Grand Haven, Mich.
Armleder—O. Armleder Co., Cincinnati, Ohio.
Atlantic—Atlantic Electric Vehicle Co., Newark, N. J.
Atlas—Martin Truck & Body Corp., York, Pa.
Atterbury—Atterbury Motor Car Co., Buffalo, N. Y.
Autocar—Autocar Co., Ardmore, Pa.
Available—Available Truck Co., Chicago, Ill.

Beck-Hawkeye—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa.
Belmont—Belmont Motors Corp., Lewistown, Pa.
Bessemer—Bessemer Motor Truck Co., Grove City, Pa.
Bethlehem—Bethlehem Motor Truck Corp., Allentown, Pa.
Betz—Betz Motor Truck Co., Hammond, Ind.
Brinton—Brinton Motor Truck Co., Philadelphia, Pa.
Briscoe—Briscoe Motor Corp., Jackson, Mich.
Brockway—Brockway Motor Truck Co., Cortland, N. Y.

C. T.—Commercial Truck Co. of America, Philadelphia, Pa.
Cameron—Cameron Motors Corp., New York, N. Y.
Chevrolet—Chevrolet Motor Co. of Mich., Flint, Mich.
Chicago—Chicago Motor Truck, Inc., Chicago, Ill.
Clydesdale—Clyde Cars Co., Clyde, Ohio.
Collier—Collier Motor Truck Co., Bellevue, Ohio.
Columbia—Columbia Motor Truck & Trailer Co., Pontiac, Mich.
Comet—Comet Automobile Co., 156 S. Water St., Decatur, Ill.
Commerce—Commerce Motor Car Co., Detroit, Mich.
Concord—Abbot-Downing Truck & Body Co., Concord, N. H.
Conestoga—Conestoga Motor Truck Co., Lancaster, Pa.
Corbitt—Corbitt Motor Truck Co., Henderson, N. C.
Couple Gear—Couple Gear Freight Wheel Co., Grand Rapids, Mich.

Dart—Dart Truck & Tractor Corp., Waterloo, Ia.
Day-Elder—Day-Elder Motors Corp., Newark, N. J.
Dearborn—Dearborn Truck Co., Chicago, Ill.
Defiance—Turnbull Motor Truck & Wagon Co., Defiance, Ohio.
DeKalb—DeKalb Wagon Co., DeKalb, Ill.
Denby—Denby Motor Truck Co., Detroit, Mich.
Diamond T—Diamond T Motor Car Co., Chicago, Ill.
Diehl—Diehl Motor Truck Works, Philadelphia, Pa.
Dispatch—Dispatch Motor Car Co., Minneapolis, Minn.
Doane—Doane Motor Truck Co., San Francisco, Cal.
Dodge—Dodge Bros., Detroit, Mich.
Dorris—Dorris Motor Car Co., St. Louis, Mo.
Douglas—Douglas Motors Corp., Omaha, Nebr.
Duplex—Duplex Truck Co., Lansing, Mich.

Ellsworth—Mills-Ellsworth Co., Keokuk, Ia.
Erie—Erie Motor Truck Mfg. Co., Erie, Pa.

F. W. D.—Four Wheel Drive Auto Co., Clintonville, Wis.
Fageol—Fageol Motors Co., Oakland, Cal.
Famous—Famous Trucks, Inc., St. Joseph, Mich.
Fargo—Fargo Motor Truck Co., Chicago, Ill.
Federal—Federal Motor Truck Co., Detroit, Mich.
Ford—Ford Motor Co., Highland Park, Mich.
Forschler—Forschler Motor Truck Mfg. Co., New Orleans, La.
Fulton—Fulton Motor Truck Co., New York, N. Y.

G. M. C.—General Motors Truck Co., Pontiac, Mich.
Gabriel—Gabriel Motor Truck Co., Cleveland, Ohio.
Garford—Garford Motor Truck Co., Lima, Ohio.
Gary—Gary Motor Truck Co., Gary, Ind.
Gersix—Gersix Mfg. Co., Seattle, Wash.
Giant—Giant Truck Corp., Chicago Heights, Ill.
Gramm-Bernstein—Gramm-Bernstein Motor Truck Co., Lima, Ohio.
Grant—Grant Motor Car Corp., Truck Division, Cleveland, Ohio.

Hahn—Hahn Motor Truck & Wagon Co., Hamburg, Pa.
Hall—Lewis-Hall Iron Works, Detroit, Mich.
Harvey—Harvey Motor Works, Detroit, Mich.
Hawkeye—Hawkeye Truck Co., Sioux City, Ia.
Hendrickson—Hendrickson Motor Truck Co., Chicago, Ill.
Hewitt-Ludlow—Ralston Iron Works, San Francisco, Cal.
Highway-Knight—Highway Motors Co., Chicago, Ill.
Higrade—Higrade Motors Co., Harbor Springs, Mich.
H & M—H & M Motor Truck Co., Inc., Baltimore, Md.
Hood—Hood Mfg. Co., Seattle, Wash.
Hoover—Hoover Wagon Co., York, Pa.
Huffman—Huffman Bros. Co., Elkhart, Ind.
Hurlburt—Hurlburt Motors, Inc., New York, N. Y.

Independent—Independent Motor Co., Youngstown, Ohio.
Independent—Independent Motor Truck Co., Inc., Davenport, Ia.
Indiana—Indiana Truck Corp., Marion, Ind.
International—International Harvester Co., Chicago, Ill.

Jones—Jones Motor Car Co., Wichita, Kans.
Jumbo—Nelson Motor Truck Co., Saginaw, Mich.

Kalamazoo—Kalamazoo Motor Corp., Kalamazoo, Mich.
Kankakee—Kankakee Automobile Co., Kankakee, Ill.
Keldon—House Cold Tire Setter Co., St. Louis, Mo.
Kelly-Springfield—Kelly-Springfield Motor Truck Co., Springfield, Ohio.
Keystone—Commercial Car Unit Co., Philadelphia, Pa.
Kimball—Kimball Motor Truck Co., Los Angeles, Cal.
King Zeitler—King Zeitler Co., Chicago, Ill.
Kissel—Kissel Motor Car Co., Hartford, Wis.
Kleiber—Kleiber & Co., Inc., San Francisco, Cal.
Knox—Knox Motors Co., Springfield, Mass.
Koehler—H. J. Koehler Motors Corp., Newark, N. J.
Kuhn—Kuhn Tractor Truck Co., Seattle, Wash.

Lange—Lange Motor Truck Co., Pittsburgh, Pa.
Lapeer—Lapeer Tractor-Truck Co., Lapeer, Mich.
Larrabee-Deyo—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.
L. M. C.—Louisiana Motor Car Co., Shreveport, La.
Lombard—Lombard Auto Tractor Truck Corp., New York, N. Y.
Luedinghaus—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
Luverne—Luverne Automobile Co., Luverne, Mich.

Maccar—Maccar Truck Co., Scranton, Pa.
Mack—International Motor Co., New York, N. Y.
Manly—Manly Motors Co., Waukegan, Ill.
Master—Master Trucks, Inc., Chicago, Ill.
Maxwell—Maxwell Motor Co., Inc., Detroit, Mich.
Menominee—Menominee Motor Truck Co., Menominee, Mich.
Moore—Moore Motor Vehicle Co., Danville, Ill.
Moreland—Moreland Motor Truck Co., Los Angeles, Cal.
Muskegon—Muskegon Engine Co., Muskegon, Mich.
Myers—E. A. Myers Co., Pittsburgh, Pa.

Napoleon—Napoleon Motors Co., Traverse City, Mich.
Nash—Nash Motors Co., Kenosha, Wis.
Nelson-LeMoon—Nelson & Le Moon, Chicago, Ill.
Netco—New England Truck Co., Fitchburg, Mass.
Noble—Noble Motor Truck Co., Kendallville, Ind.
Northway—Northway Motors Co., Natick, Mass.
Northwestern—Starr Carriage Co., Seattle, Wash.
Norwalk—Norwalk Motor Car Co., Martinsburg, W. Va.

O. K.—Oklahoma Auto Mfg. Co., North Muskogee, Okla.
Ogden—Ogden Motor & Supply Co., Chicago, Ill.
Old Hickory—Kentucky Wagon Mfg. Co., Louisville, Ky.
Old Reliable—Old Reliable Motor Truck Co., Chicago, Ill.
Oldsmobile—Olds Motor Works, Lansing, Mich.
Oneida—Oneida Motor Truck Co., Green Bay, Wis.
Oshkosh—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
Overland—Willys-Overland Co., Inc., Toledo, Ohio.

Packard—Packard Motor Car Co., Detroit, Mich.
Paige—Paige-Detroit Motor Car Co., Detroit, Mich.
Parker—Parker Motor Truck Co., Milwaukee, Wis.
Patriot—Hebb Motors Co., Lincoln, Nebr.
Piedmont—Piedmont Motor Car Co., Inc., Lynchburg, Va.
Pierce-Arrow—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Pioneer—Pioneer Motor Truck Co., Detroit, Mich.
Pittsburgher—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
Pony—Minnesota Machinery & Foundry Co., Minneapolis, Minn.

Rainier—Rainier Motor Corp., Flushing, L. I., N. Y.
Reliance—Reliance Motor Truck Co., Appleton, Wis.
Rennoc—Rennoc-Leslie Motor Co., Philadelphia, Pa.
Reo—Reo Motor Car Co., Lansing, Mich.
Republic—Republic Motor Truck Co., Inc., Alma, Mich.
Riker—Locomobile Co. of America, Bridgeport, Conn.
Rock Falls—Rock Falls Mfg. Co., Sterling, Ill.
Rowe—Rowe Motor Mfg. Co., Lancaster, Pa.
Royal—Royal Motor Truck of N. Y., New York, N. Y.

Sandow—Sandow Motor Truck Co., Chicago, Ill.
Sanford—Sanford Motor Truck Co., Syracuse, N. Y.
Schacht—G. A. Schacht Motor Truck Co., Reading, Pa.
Schwartz—Schwartz Motor Truck Co., Reading, Pa.
Selden—Selden Truck Corp., Rochester, N. Y.
Service—Service Motor Truck Co., Wabash, Ind.
Shaw—Walden W. Shaw Livery Co., Chicago, Ill.
Signal—Signal Motor Truck Co., Detroit, Mich.
Standard—Standard Motor Truck Co., Detroit, Mich.
Sterling—Sterling Motor Truck Co., Milwaukee, Wis.
Stewart—Stewart Motor Corp., Buffalo, N. Y.
Stoughton—Stoughton Wagon Co., Stoughton, Wis.
Sullivan—Sullivan Motor Truck Co., Atlanta, Ga.
Superior—Superior Motor Truck Co., Atlanta, Ga.

Texan—Texas Motor Car Asso., Fort Worth, Texas.
Tiffin—Tiffin Wagon Co., Tiffin, Ohio.
Titan—Titan Truck Co., Milwaukee, Wis.
Tower—Tower Motor Truck Co., Greenville, Mich.
Traffic—Traffic Motor Truck Corp., St. Louis, Mo.
Transport—Transport Truck Co., Mt. Pleasant, Mich.
Triangle—Triangle Motor Truck Co., St. Johns, Mich.
Triumph—Triumph Truck & Tractor Co., Kansas City, Mo.
Twin City—Twin City Four Wheel Drive Co., Inc., St. Paul, Minn.

Union—Union Motor Truck Co., Bay City, Mich.
United—United Motors Co., Grand Rapids, Mich.
U. S.—United States Motor Truck Co., Cincinnati, Ohio.

Velie—Velie Motors Corp., Moline, Ill.
Victor—Victor Motor Truck & Trailer Co., Chicago, Ill.
Vim—Vim Motor Truck Co., Philadelphia, Pa.

Walker—Walker Vehicle Co., Chicago, Ill.
Walter—Walter Motor Truck Co., New York, N. Y.
Ward—Ward Motor Vehicle Co., Mt. Vernon, N. Y.
Ward La France—Ward La France Truck Co., Inc., Elmira, N. Y.
Watson—Watson Wagon Co., Canastota, N. Y.
White—White Co., Cleveland, Ohio.
White Hickory—White Hickory Wagon Mfg. Co., Atlanta, Ga.
Wichita—Wichita Falls Motor Co., Wichita Falls, Tex.
Wilcox—H. E. Wilcox Motor Co., Minneapolis, Minn.
Wilson—J. C. Wilson Co., Detroit, Mich.
Winther—Winther Motor Truck Co., Kenosha, Wis.
Witt-Will—Witt-Will Co., Inc., Washington, D. C.
Wolverine—American Commercial Car Co., Detroit, Mich.

NEW COMMERCIAL CARS

Master Brings Out New Model Designed Especially for Farm Service

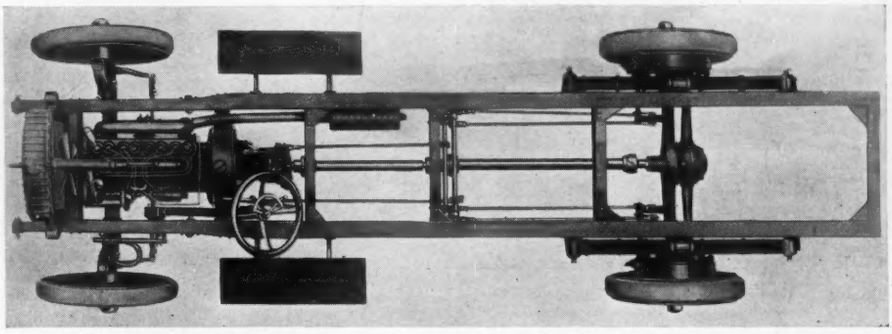
ANTICIPATING an unusual demand for a lighter type truck for farmers, produce men, merchants, manufacturers and express companies, in fact, all classes of business requiring a dependable haulage unit of light tonnage, the Master Truck, Inc., Chicago, Ill., has started production on a new 1½-ton chassis so as to be prepared to fill this demand. The Master line of trucks now consist of a 1½-ton, 2-ton, 3½-ton, 5-ton, and 6-ton model.

This new model, known as the Master Junior, is made with two types of rear axles—worm or internal gear. This new model is built along lines similar to the earlier models.

The power is obtained from a Buda type OU engine in unit with the clutch and transmission. This heavy-duty engine has a bore of 4⅛ in. and a stroke of 5½ in., and is capable of developing 40.5 hp. The power is transmitted through a multiple-disk, dry-plate clutch having a Raybestos facing and a three-speed transmission of the selective type. The gears are nickel steel and chrome nickel of large diameter and mounted on annular ball bearings. Transmission gear ratios for both models are: High, 1:1; second, 1.7:1; low, 3:1; reverse, 3.5:1. The final drive in the internal gear is 8:1, and in the worm 7.75:1. Power is distributed through a two-piece tubular propeller shaft to the rear axle. The propeller shaft is mounted on two universals and is supported in the center of the chassis by a self-aligning ball bearing. This construction is said to eliminate shaft whipping.

A Torbensen internal gear fitted with M & S self-locking differential is used in one model and a Timken worm gear, fitted throughout with Timken roller bearings, is used in the other model.

The crankshaft is carried in bearings, measuring 1¾ x 3⅛ in. front, 22 x 2½ in. center, and 2⅛ x 4 in. rear. The connecting rod bearings are equally generous in size, measuring 1⅞ x 2⅜ in. at the lower end and 1 1-16 x 2⅛ in. at the upper or piston pin end. The power plant, frame, axles, springs and other parts are all of over-size construction to take care of possible overloading.



Airplane View of the Internal-Gear Drive Master Junior One and a Half Ton Truck Chassis, Showing Disposition of Units

Lubrication is through a plunger feed pump together with splash and gravity feed.

Water is forced through the pipes and new tubular radiator by a centrifugal pump of Master make. This radiator has an especially large cooling surface. The tanks and frame are cast iron. The radiator mounting is by cushion spring to absorb vibration and road shocks.

The carburetor is a Master with governor attached, and air adjustment being controlled from the dash.

Ignition is through an Eisemann high-tension magneto, waterproofed and equipped with an impulse starter. This impulse starter is automatically tripped just before cranking and throws the rotor of the magneto about 80 deg. of a circle, giving a hot spark at low cranking speed. When the engine attains a speed of slightly over 100 r.p.m., the impulse starter is automatically thrown out of action and the spark is then manually controlled from the lever on the steering wheel quadrant.

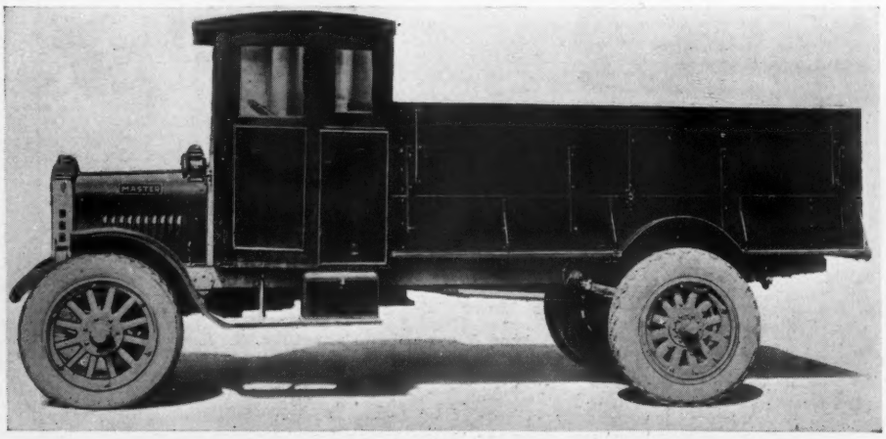
The frame, which is pressed steel with all spring hangers and cross members hot riveted, is of 5½ in. section with 3¼ in. channel, 3-16 in. stock. There are five cross members reinforced by gusset plates. The overall length of the frame is 207¾ in. Wheelbase is 142 in. and loading space behind driver's seat is 120 in.

The front axle in both models is a Timken, with Timken roller bearings. The springs are heat-treated alloy steel, the front measuring 2 x 44 in., ten leaves and the rear 2½ x 52 in., thirteen leaves.

The truck built with the internal-gear-drive is equipped with the conventional internal expanding and external contracting brakes while the worm-drive models use the Duplex type inclosed.

The steering gear is semi-reversible, worm and split-nut type, fitted with an 18-in. steering wheel, on which is mounted the throttle and spark controls. Control is center and drive left hand.

This new model with worm drive lists at $1990, with internal gear $1890. The chassis is finished in two coats of gray lead. The equipment includes two oil dash lamps and tail light, seat cushion and tools.



The Master One and a Half Ton Junior With Special Body and Cab and Pneumatic Tires
This body is ideal for farm use in that it can be made any height to suit the load

Dependable Trucks Have New Features

THE Dependable Truck & Tractor Co., Galesburg, Ill., is manufacturing trucks of two capacities—1½ and 2½ tons. The various parts have been assembled to permit of ready access for adjustment when necessary. An unusual feature in the make-up of these trucks is a device for cooling the oil—called the Viscometer. The radiator has a special spring mounting to overcome any synchronized vibration developed by the main springs. Both have a vacuum fuel feed system.

Two and a Half Ton Dependable Truck With a Contractor Body
Note the external equipment which includes a bumper, Boyce Moto-Meter, steel tool box, crown fenders and steel runningboard

The engines used in the Dependable trucks are of Buda make, having a bore and stroke of 3¾ x 5¼ in. and 4¼ x 5½ in., for the 1½-ton and 2½-ton jobs, respectively.

The power of the engine is transmitted through a multiple dry disk clutch and Fuller transmission. Then through a tubular propeller shaft with Acme oil-tight universal joints that require attention only every three or six months. It is claimed that this is the only joint that uses oil for lubrication. Final drive is through a Wisconsin worm drive axle.

The hot oil is drawn directly from the crankcase by a gear non-priming pump to the Viscometer, which in addition to other parts consists of approximately 6 ft. of spiral tubing. After being cooled the oil passes to the bearings, at the same time keeping them cool. This device is claimed to restore the viscosity of the oil.

Ignition is through a Dixie high-tension magneto with an automatic impulse starter.

A Zenith carburetor, which receives its fuel from a Stewart vacuum tank, is used. The fuel is delivered from a 20-gal., 16-gage pressed steel seamless tank, located under the seat.

The radiator used is of heavy-duty design and very large in size. It is inclosed in a cast iron shell mounted on two large half oval springs, designed to absorb shock, thus preventing the solder from crystallizing and causing the radiator to leak. This spring is constructed to overcome all synchronism developed in the main springs. The tube and spiral fin core of the radiator can be removed readily for repair. The springs used are made of alloy steel and are guaranteed to last the life of the truck. They are bronze-bushed and use extra large nickel-steel ground pins, as this is considered the best combination for wearing surface.

Steering is through a Ross gear with a steering wheel 20 in. diam. The controls, which are on the inside, are securely braced to the dash, preventing all unnecessary vibration.

Other standard units used in this assembly are Boyce motometer, Pierce governor, Goodyear, Firestone or Goodrich tires; 16-gage crowned fenders with steel running board and pressed steel tool box, extra large and well proportioned seat.

The equipment includes a hand-operated horn, truck seat and dash with lazy back, tools, jack, oil can and tool box.

The optional equipment consists of a cab, odometer, starting and lighting and battery, pneumatic tires and power tire pump, hand and power hoist and bodies.

Automatic Rocker Dump Body for the Ford Truck

The Anthony Company, Inc., Streator, Ill., is offering to the trade a new Automatic Rocker Dump Body for the Ford truck. This dump body is easily attached and is featured by two automatic actions. After the body has been caused to dump, which it does automatically by merely releasing the retaining lever at the center of the driver's seat, the body will again return to its original position automatically without the consumption of power. The body tips to an angle of 50 degrees. This body, which is made of steel and malleable iron, has a capacity of one-and-a-half yards. When the body has assumed an angle of 50 degrees, a lever pressing upon the rear tire unlatches and thus automatically opens the tail gate. The relatching of the tail gate is accomplished from the driver's seat, by a lever at the left front body corner. Loads can be dumped without stopping the truck. The load in this body is carried well forward of the rear axle.

This new dumping body may be attached to the Ford truck frame without alterations. Rocking cams that operate in the inverted "V" shaped racks, fastened to the chassis by bolts which pass through the standard holes in the rear member of the chassis frame, provide the automatic actions. The front end of the racks are carried upon brackets attached to the chassis frame by four "U" bolts. The front support is malleable iron "A" shaped frame resting upon the chassis back of the driver's seat and secured by "U" bolts.

This Body Upon Depositing Its Load, Returns Automatically to Its Former Position.

Selden Offers New Light Model

THE Selden Co., Rochester, N. Y., has recently announced the starting in of production on a new 2½-ton model. The general outline of this model is exactly similar to the 3½-ton truck brought out a few months before, and which was described in the September issue of the COMMERCIAL CAR JOURNAL, except that this model is smaller in proportion. This new Selden product embodies the familiar flexible frame; amidship transmission designed for all types of power take-off; new flexible radius rods and special oversize clutch.

Power is obtained from a Continental engine having a bore of 4⅛ in. and a stroke of 5¼ in., and is capable of developing 27.2 hp. S. A. E. rating. The speed is limited to 1200 r.p.m. by a Pierce governor. The clutch, which is of the dry plate, multiple disk type, consisting of 13 driving plates, is fully enclosed and directly attached to the engine. A universal propeller shaft connects the clutch to the amidship transmission. The transmission is of the sliding gear type and is made up of nickel steel gears and chrome nickel shafts, mounted on Timken bearings. The gear ratios are as follows: First, 37.5:1; 2nd, 22:1; 3rd, 11.6:1; 4th, 7.75:1, and reverse, 44.9:1. A larger size universal drive connects the transmission to the rear axle. Final drive is through a worm drive full floating axle mounted in a one-piece steel housing. It has a gear ratio of 7.75:1. The drop forged front axle is of "I" beam section and is reinforced by tie rods.

The engine is fitted with a high tension magneto and an automatic float feed carburetor with adjustment controlled from the dash.

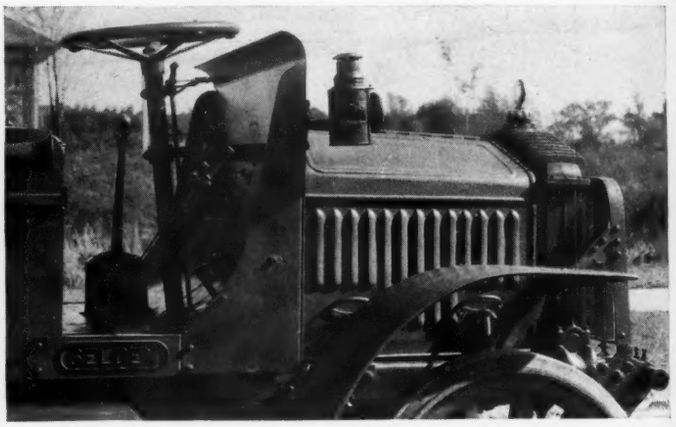
The radiator, which is of the built-up type, consists of vertical tubes with helical cooling fins and is mounted on a non-binding trunnion suspension.

The wheels, which are of the heavy artillery wood type, are 36 in. diam., the front wheels differing from the rear only in that the spokes in the rear wheel are 2½ in. diam., whereas those in the front are 2 in. diam. The front tires are 36 x 4 in. single and the rear 36 x 7 single, of the standard pressed-on type. Firestone and Goodyear are standard equipment.

Steering is by a semi-reversible and heavy worm and sector gear with a 20-in. steering wheel. The steering gear is on the right-hand side. The brake lever is mounted on the frame and the shift lever is mounted on the clutch housing.

The frame side members are pressed carbon manganese steel. The frame construction as a unit is of flexible type. This type of frame absorbs shocks and twisting strains, preventing the passage of vibration and strain to the delicate units and mechanism. A notable feature is the absence of rivets throughout the entire frame construction. The frame section is 2¾ in. wide and 6½ in. deep and ¼ in. thick special frame stock. The springs are semi-elliptic. The front springs are 2½ in. wide by 40 in. long, and the rear is 3 in. wide by 54 in. long. The gasoline tank, which is mounted in the seat, is a heavy steel leaded tank and has a capacity of 30 gal.

The truck is equipped with the following standard equipment: Two locomotive type dash and one tail light, license plate brackets, mechanical horn, heavy jack, motor meter, hubodometer, radiator guard, heavy nickel steel bumper, complete set of tools and instruction books. It is finished in two coats of lead.



From This Illustration a Clear Conception of the Disposition of the Control Members May be Obtained

Three-Quarter View of the New Selden Chassis
The radiator is mounted on a non-binding trunnion suspension

L. C. Graves Commercial Bodies for Ford Trucks

The L. C. Graves & Company, Springboro, Pa., is manufacturing waterproof, gumwood panel bodies for Ford one-ton trucks and other sizes so constructed as to come directly into the class of winter equipment. An enclosed cab, which is part of this body, is designed to shelter and protect the driver under all winter conditions.

This body is made in two sizes. The small size is constructed for a Ford one-ton truck, which provides 90 x 48 in. of loading space in back of the driver's seat, and a larger size, 100 x 52 in., to accommodate any three-quarter and one-ton jobs, but particularly the Olds Economy truck.

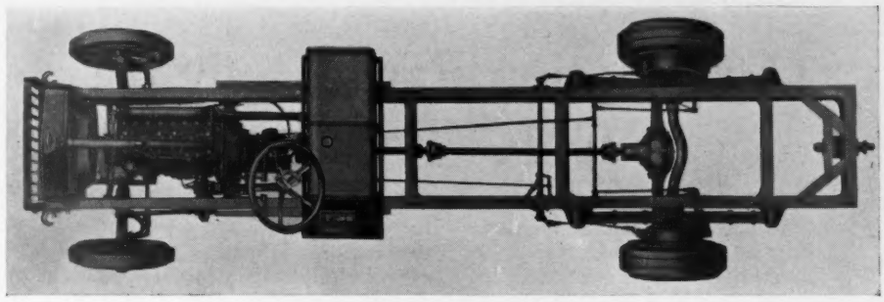
The entire body is constructed of haskelite or vehisote panels ⅜ in. in thickness. The frame is built up of white oak and ash, which is tightly sealed on the inside with 5-16-in. grooved and tongued ceiling. The upper section of the front of the body is of plate glass, securely fitted in heavy framework and so arranged as to give a wide range of vision. The windows are of the drop sash type. Two swing doors in the rear and two sliding doors in back of the driver's seat afford easy access to the interior racks. The fixtures, which include hinges and door handles, are of heavy nickel plated metal. From the top of the driver's seat to the ceiling directly in back of the seat, a space of 24 in. is divided into two sections. One-half is arranged for pie racks and the other half, which consists of five drawers, for those supplies that are continually in demand. Beneath this section and the remainder of the body in the rear is a space that is constructed with sectional sliding shelves, which run parallel to the direct path of direction of the truck. The entire body is finished in standard baker's cream color.

Mohawk Rubber Company, Akron, O., is about to place on the market a line of special pneumatic truck tires. Some sizes are already being produced and, as soon as the present increase in factory and equipment is completed, all sizes are to be manufactured.

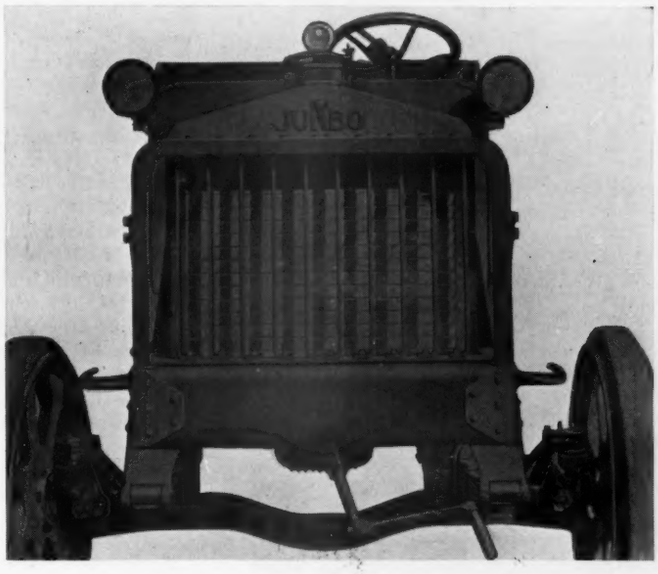
Nelson Offers New Model Jumbo

THE use of standardized and well known units is the foundation upon which the new Model No. 35, 3½-ton Jumbo truck, built by the Nelson Motor Truck Co., Saginaw, Mich., is based. The Jumbo line will be still further increased with the addition of another new 1½-ton model which will be in production about the first of next year.

This model, like the 2½- and 1½-ton models, is built up of the following standard units: Buda engine, Clark internal gear axle, Eisemann magneto, Detroit steel springs, Duplex governor, Brown-Lipe transmission, Zenith carburetor, Jacox steering gear, Clark steel wheels, Timken and Hyatt bearings.



Overhead View of the New Jumbo Chassis
Drive is through a three-joint propeller shaft with an intermediary universal suspended from a fifth cross-member



Front View
Front end of frame forms a bumper. The shutter-equipped radiator is protected by a strong guard. Note folding crank-handle and support.

A three-joint propeller shaft, with intermediary universal suspended from a fifth cross member, is so arranged as to provide a straight drive shaft and thereby eliminate any undue wear or strain on the bearings and universals, and provide the transmission with greater power by reducing friction.

Another feature of this truck is the radiator which is of the spiral fin and tube type. In addition to a fan shroud that regulates the flow of air by drawing a uniform amount of air from every portion of the core, manually operated shutters increase effectiveness of the cooling system by controlling the thermostatic temperature. The radiator is protected by a strong guard, mounted independent of the radiator and braced to the frame. The front end of the frame extends sufficiently beyond the radiator to form an effective bumper. Pig-tail towing hooks are attached at the front to each side of the frame. A heavy spring drawbar coupling for connecting trailers is provided at the rear.

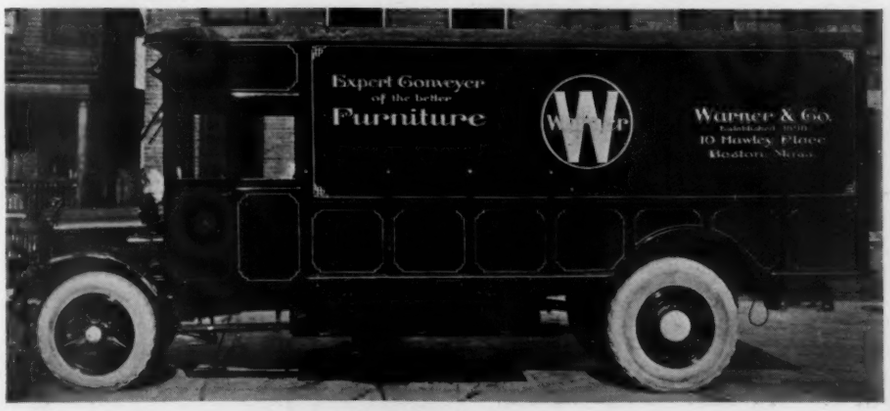
The following equipment is standard with no extras except the body: All-steel cab with disappearing curtains, opening with doors; three-man seat, rain vision windshield set in rubber, electric lights, generator and storage battery; ammeter, electric horn, impulse starter and special Jumbo foot-form accelerator. A heavy ball thrust bearing in steering gear provides for easy steering.

Special Moving-Van Body for Long Hauls

The Brown Body Corp., successors to the Brown Auto-Carriage Co., of Cleveland, O., who were recently capitalized for $1,000,000 intend to specialize in commercial truck bodies in addition to their regular line of special jobs. Anticipating a demand for bodies adaptable for long distant transportation, production on a moving van body, which embodies many entirely new features in body construction, has been recently announced by the company.

It is provided with a pullman driver's cab equipped with three separate cots for the accommodation of the crew in overland work. These cots when not in use can be folded up out of the way, affording seating capacity for four passengers in addition to the driver. Ventilation is provided by a special arrangement over the windshield. Warmth in cold weather is also assured by a heater that obtains its heat from the engine exhaust. Both body and cab are equipped with electric lights.

A special feature of the body construction is the fact that the lower panels are built on the inside and the upper panels on the outside which result in a long opening the full length of the body at the dividing line, which permits tieing of the load when on long distance hauls. The rear end gate consists of a lower half that drops down, and an upper half that is divided in two sections, each section swinging back against the body panels where they are securely held in place by catches. The tool equipment box and other paraphernalia is secured in a lug-



Special Moving-Van Body for Long Hauls

gage box which is suspended on each side of the body and on a line with the running board. The interior of the body is natural wood and the exterior is finished in dark Brewster green.

The accompanying illustration shows the new type of moving van body mounted on a 5-ton White chassis. This van is intended for long distance hauling between Boston and all surrounding cities.

Combination Farm Body for GMC Trucks

APPRECIATING the problem of the owner, particularly the farmer, who has to haul a variety of products requiring distinctly different types of body construction, the General Motors Truck Co., Pontiac, Mich., has endeavored to meet and relieve this need with a new all-service body. These bodies are built in sections and are produced in various sizes to conform to the various G M C Models.

The stock racks are fitted in practically the same manner but are also bolted to the platform. The tail gate if used is so constructed that a greater amount of rigidity is insured. The sliding door arrangement eliminates the necessity of removing the gate, and causes a saving of considerable time, as it is very readily manipulated and it also stays put when on the road and will not open due to vibration.

The Stock-Rack Body is Provided With a Sliding Door in the Rear

The body consists of a solid platform with different type sides which are interchangeable.

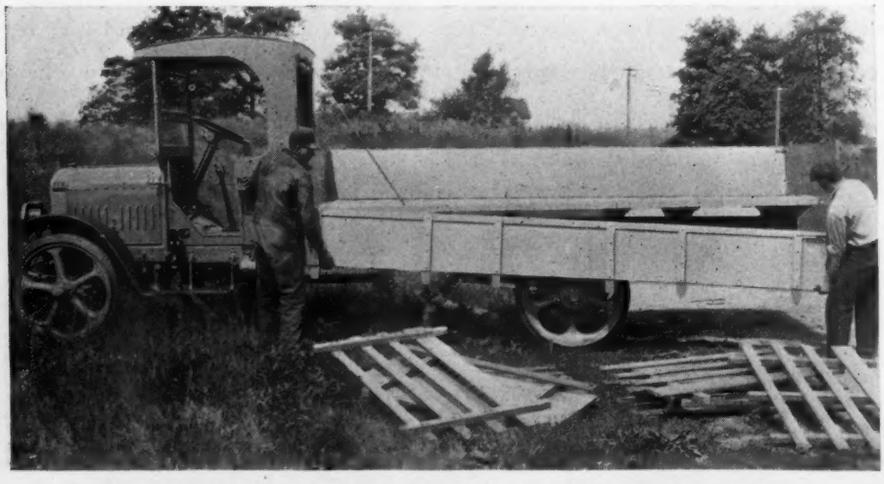
A grain box can be had by inserting the upright posts that are fastened on the sides and extend beyond the lower edge of the box sides, into keepers spaced along the edge of the platform.

Putting on the gate stakes changes the body into a regular stake and rack truck for general commercial use. The sides are fitted to the platform in the same manner as the previous styles. The sides are made more secure and rigid by pinhinging the sections together.

The following is a table of dimensions of all-purpose body applicable to the G M C Model 16 truck:

	Grain	Stock	Stake
Length	102	102	102
Width	67	67	67
Height	14	48	27
Sections	1	1	2

This body is made in various sizes for the entire line of G M C trucks.



This GMC Truck is Being Equipped With the Grain-Box Type Body

Bethlehem Makes Another Model

Announcement of the addition to its line of a three-quarter-ton model has just been made by the Bethlehem Motors Corp., Allentown, Pa. The line now includes the three-quarter-ton, one and one-half-ton, two and one-half-ton, and three and one-half-ton models. Included in the specifications of this model are electric starting, electric lighting, and specially designed Bethlehem motor, Bosch magneto, bronze-backed motor bearings, Spicer drive shaft, bevel gear rear axle, Ross steering gear, chrome vanadium steel springs, semi-flexible frame, Meyers magazine oiling system, cord pneumatic tires, 35 x 4½ front, and 35 x 5 rear. The company places the list price of the truck at $1495. Quantity production schedule will be started in January.

The model will be offered only as a chassis, to which any type of body may be added locally without chassis interference. The company will offer a standard combination body, of which the foundation is an open express body, and to this body may be fitted a cattle rack, grain sides, and a canopy top, thus giving an all-purpose body of four or five different combinations.

Rayfield Thermostat

A new device which will eliminate the trouble and annoyance of starting the engine in cold weather and which is to be known as the Rayfield Thermostat, is being offered to the trade by the Beneke & Kropf Mfg. Co., Chicago, Ill., manufacturers of Rayfield carburetors. The latest model is featured by several improvements which make this device simple and automatic in operation. It is easily attached on any truck on the top water connection where there is no possibility of clogging. The company claims that it ensures easy starting and does away with a cold motor.

It enables the motor to warm up quickly by controlling an effective circulation of water through the radiator and motor block. If the motor does warm up quickly, a minimum of unburned fuel escapes into the engine, dilutes the oil in the crankcase and forms carbon in the cylinders and spark plugs. The attachment of this device is declared to prevent these troubles.

Quantity production on this product enables the company to put it on the market at a reasonable price.

Ship-By-Truck Tour recently held in Baltimore, Md., was a decided success. Six hundred and twenty trucks were in line and 50 makes were represented.

Tommy Starts in Business for Himself

Yes, Tommy Williams Was Some Truck Salesman, But He Didn't Know Much About Business Principles. The Young Truck Dealer Has Lots to Learn

By C. P. SHATTUCK

Editors Note—This is the first of a serial dealing with the problems of the new truck dealers. The next article will show how Tommy Williams developed his sales force and organized his departments.

THERE was an undercurrent of excitement running through the various departments of the big building occupied by the Pawtucket Motor Truck Company. Del Hawkins, sales manager of the Pawtucket factory, who always made it a rule to call on J. G. Wilkins, head of the Pawtucket Motor Truck Company, distributors for the State, when in the East, sensed something unusual when he opened the salesroom door.

"What's up, Miss Brown?" This to J. G.'s secretary, who also officiated at the switchboard and information desk. "Everybody seems to be anticipating some big event. Even Jimmy" (Jimmy is J. G.'s chauffeur and is always sent with the car to meet the sales manager) "was charged to over 1300 with suppressed excitement, and kept muttering, 'Some surprise, some surprise,' all the way over, and when I quizzed him he apologized and said he was thinking."

"Why, Mr. Hawkins, haven't you heard the news?"

"Me? News? What news? J. G. isn't thinking of getting married, is he?" And thoughts of J. G. taking unto himself a young wife were displeasing to the sales manager. He was a confirmed bachelor and served but one mistress, the truck industry.

"Nothing like that," retorted Miss Brown, "but Mr. Wilkins would make any woman a fine husband. He's a fine man." This in rather pensive tones.

"Well, Miss Brown, give me the sad news. Don't keep me waiting, as I am subject to heart trouble, you know."

"Why, Tommy Williams is leaving us today, and we and the boss are going to give him a swell present. The presentation takes place at two and you are just in time. Tommy is going into business for himself. He has taken the agency up-state for the Providence truck. And Tommy is going to be married, too, and—"

"That's enough. Tell me no more. Bad enough to leave a good job, but to take on a wife. Oh, good night! How does J. G. take it?"

Before Miss Brown could answer J. G. breezed in, shaking hands and greeting Hawkins in that hearty, wholesome manner that won hosts of friends and paved the way for many sales of Pawtuckets.

"What's this I hear about Williams leaving, J. G.?"

"Yep, that's right. Tommy leaves us today. Been with us for five years, and I tell you, Del, that boy has put a lot of Pawtuckets on the map in this neck of the woods. A good boy, Del, and I want to see him do well."

"He's making a mistake. He will never go through, J. G. Granted he can sell trucks, but what does he know about business? It's a different story selling trucks with a big organization in back of you, with service and real heads, and trying to sell without an organization, and Tommy is too blamed impulsive, and—"

"Now, now," interrupted J. G. "Don't knock, Del. We all have our weak points, and you have a big one."

"Suppose I'm guilty, but what is it this time? You have a new indictment every time I call."

"Trying to load me up with about 200 more trucks than my territory will absorb. But let's forget business and have lunch, for we are making Tommy a little farewell present, and he hasn't an inkling of it"—and J. G. chuckled.

Shortly before the appointed hour Bill Smith, head of the used truck department, inveigled Tommy Williams into the remote corner of the service station with the excuse that the instruction sheet for equipment on a newly sold truck had been lost, and that new orders were needed. Ordinarily Tommy would have been suspicious, would have known no orders could be lost with the system, but Tommy's thoughts were not on business that day.

Smith went over the truck. Awful slow, thought Tommy. Guess Smith is losing his pep. In the midst of a discussion as to the proper location of a signal switch the telephone rang and Smith answered. "J. G. wants you right away in the salesroom, Tommy, and he says hurry." Tommy did, and as he entered he saw the entire staff of the company aligned opposite the entrance through which new cars are shunted into the show room.

Good Publicity for J. G.

Now Tommy, being a wise young man, was not surprised. He knew it was customary to bid the departing employee a fitting farewell if said employee was in good standing. He had participated in similar events with much pleasure, for he was a versatile young man, but somehow his sang froid departed as he entered the room and found a battery of eyes focussed on him. And there was Del Hawkins, and the automobile editors from the newspapers, for J. G. never lost an opportunity of securing publicity for the Pawtucket passenger cars and trucks.

But why go into details. The farewell to Tommy did not differ from others, except perhaps in one respect, and that was the presentation of the "slight remembrance, etc." Miss Brown had been selected by the heads of the departments. Perhaps they thought that it was a fitting time to make peace between Tommy and the young lady—for when these two met the dove of peace always took flight. Now Miss Brown had prepared a nice speech, had memorized it, but, like many others, became afflicted with stage fright at the critical moment. And so, being human, she floundered through the conventional form of speeding the parting guest and pressed a button.

The doors swung open, and with the Klaxon shrieking, J. G.'s chauffeur drove a brand new Pawtucket six sedan on to the show room floor and up to Tommy. Setting the brakes Jimmy shut off the power, opened the door, descended, and with his best

bow remarked: "With the compliments of the Pawtucket Motor Truck Company and its employees."

It was dramatic. J. G. always had an eye for innovations, as was attested by the remark of one of the automobile editors to the effect that it was good copy for J. G. And it was some car. The head tester tried out ten before he found one with the right pep. And every department had a finger in its preparation, from the wash room to the accessory, and no equipment making for convenience or comfort was lacking. J. G. never did things by halves. And one of the newspaper men, tickled with the idea of putting something over on the society editor, incorporated in his copy a description of the ribbons, etc., decoration by the office staff, with the suggestion that the trimmings would be fitting at Mr. Williams' wedding, announcement of which was made for the first time.

Tommy Waxes Reminiscent

After the excitement subsided the party was broken up by J. G. requesting Del Hawkins, Caleb Jones, head of credit department, and Tommy to adjourn to the private office. Seated in the office where he had learned that selling transportation, not trucks, was the keynote of success in the commercial car field, the events of the past five years flashed through Tommy's mind. He recalled how J. G. guided him in the path of successful merchandising, how he advised him in his personal affairs, solved many problems to which the human being is heir to. Leaving the Pawtucket Company was not so easy after all, thought Tommy. Perhaps he was making a big mistake. And so on ran Tommy's thoughts.

"Thinking, Tommy?" broke in J. G.

"I-I was, Mr. Wilkins. I wonder whether or not I am taking the right step. I've half a mind to chuck it all and stick with you. I could break that contract and—"

"You won't do anything of the kind," snapped J. G. "You're under the influence of the party. You're going ahead as you planned and you've got to make a success. Why, dammitall, do you think I'm going to have the row say that the best salesman we ever had pulled a flivver? Can't you see that if you fall down it will reflect on me? Do you suppose I'll have 'em make me the butt of their jokes? Tommy, you've got to go through and make a success even if I have to run your company myself."

At the last remark old man gloom fled and the joys climbed into Tommy's lap. Knowing J. G., he didn't indulge as would some in acknowledgments, but, thought Tommy, "With J. G. with me, how can I fail?"

With his unerring instinct J. G. guessed what was passing in Tommy's mind. "Thanks for the compliment, Tommy, but the issue rests with you, and that is why I have asked Mr. Hawkins and Mr. Jones to be present. I want to go over your proposition, and I know you will not take it amiss if we ask you questions. Now this is an open meeting, boys, and talk right straight from the shoulder," and J. G. arose and passed around the cigars.

"Now, Tommy," said J. G., "what kind of a place have you and how much are you paying for rent?"

"I have two places in view," said Tommy. "One is on the principal street with a good show room and repair shop.

"What's the rent?" snapped J. G.

"$500 a month."

"Too much, Tommy, too much. You can't swing it even if you have a little capital. It's a mistake all you young men make. You pay too much rent. Don't go over $150 the month to start with. Time enough to have a fancy place when you are on the map and the business grows."

"J. G. is right," interrupted Del Hawkins. "Start moderately. I know of several men who put all their powder in show rooms instead of in merchandising and—"

"But," broke in Tommy, "you chaps have harped on the advantage of good show rooms, window displays and all that. Not very consistent, I'll say. Well, you ought to know, and I'll take that place on the back street, but I sure would like the other."

"What kind of a contract have you got, Tommy," asked J. G. "Is it one of those 30-day affairs, or does it give you a chance to prove you can sell trucks. Has it a clause that provides for an automatic renewal at the end of the year if you make good? Contracts are queer birds and you want to look them over some careful. Now the right kind of a contract is—"

"Oh, say, J. G.," broke in Hawkins. "To hear you talk one would think we never gave a dealer anything but the worst of it. Any kick coming on the Pawtucket contract? What?"

Analyzing Dealer Contracts

"No, Del," said J. G., "I have no kick. It is a good contract. It ought to be, for I insisted that it should be when I invested my thousands. All I want Tommy to do is to see that he gets an even break; that after he sells the Providence trucks, gives service and all that, that he has a chance to cash in on his investment and get the reward of his labors. The contract question is too lightly passed over by some dealers."

"Oh, my contract is all right," interrupted Tommy, noting signs of a clash between Del Hawkins and J. G. "I'm setting pretty if I make good."

"Suppose we let Tommy outline his plan before we make any suggestions," remarked the credit man.

"Good idea," said J. G. "Shoot, Tommy."

"Well," said that personage, "I have enough capital to pay for the three different model chassis the Providence makes and am going to hook up with a finance company. You know what that plan is, discounting the paper and all that. I figure after I have sold twenty trucks I won't need any financing, for the profits will swing me and—"

"Hold on a second," interrupted J. G., "you plan that the profits will be enough, do you? What about your overhead, salaries, etc.? Do you think you can get away with it?"

Hawkins Quotes a Success

"Why not?" remarked Hawkins. "I know of several dealers who started in with small capital and after selling 20 trucks were able to get along nicely. Now, J. G., you listen; you don't know it all. I recall the case of a young man, who, by the way, had been quite successful as a salesman for a company equally as big as yours, J. G. He had a few thousands, some brains and a lot of pep. A real hard worker, the type we call persistent. He hired a place for $125 the month, engaged a bookkeeper, a mechanic and a helper. Now this young man organized this small crew, then got busy and went out and sold trucks. He was the sales manager and salesmen. A mighty good plan, for when he sold a truck he knew what he would give and not give the customer on service. And what he promised his service department made good on. Now after he placed twenty trucks he took that money and financed himself. Today he can get his paper discounted at the bank without any trouble. And there's many others, too."

"That's about my layout," said Tommy. "I am going slow and concentrate on selling transportation. I really know something about the truck industry even if I was a salesman. That Providence truck is a good one and I'm going to put it on the map. Later I plan to add a salesman or two."

"How are you going to hire them?" asked J. G.

"A drawing account and commission," answered Tommy.

"Bad dope, Tommy," said J. G. "You can't afford drawing accounts or salaries at the start. Pick out a good man or two and use the commission plan. Your capital is too small for any other way. Am I right, Del?" The sales manager of the Pawtucket factory nodded his approval.

"Have you engaged a bookkeeper?" asked the head of the credit department.

"No," said Tommy, "but I have one in view, a graduate from a business school. They say he can make figures lay down and stand up. And he will start at a small salary, too."

"By the great horned spoon, Tommy, you don't mean to tell me you are going to let a novice experiment with your business? Mr. Jones, kindly advise this young man the relation of bookkeeping to failures in the merchandising of trucks," said J. G.

"Why, er, Mr. Williams, Mr. Wilkins means that you have not the right kind of a bookkeeper."

"Has he seen him?" retorted Tommy. "How does he know what the party knows?"

"I'll do the telling," grimly remarked J. G. "Tommy, many a truck dealer has gone to the wall and stuck there because he did not have a good bookkeeper. I

don't mean one that can make figures perform stunts, a mathematically correct person, but one who can keep the right kind of books. A bookkeeper is a person that can estimate correctly your overhead charges, many of which may be classified as intangible. The right kind of bookkeeping will distribute the costs of your different departments correctly. You know how our service department was run formerly, don't you? Never made a cent; always was the mouse eating the profits. Makes money now. Why? Because I analyzed its costs, aided by the bookkeeper, and plugged the leaks. That's the function of a good bookkeeper, and he's got to be a good one."

"J. G. is right, Tommy," said Hawkins. "You need the best you can get. Now, that reminds me of a case out in Kansas, of a bookkeeper of the type that could keep books, but that was all. He—"

A heavy pounding on the door. J. G. arose with wrath in his eyes and flung open the door. It was Jimmy, J. G.'s chauffeur, and who was not afraid of J. G.'s outbreaks. "Say, Mr. Hawkins, if you want to get that 5.05 flyer you will have to hustle some. We've got about ten minutes, but the old Pawtucket six can make it."

J. G. Puts One Over

This broke up the conference. Tommy shook hands with the Pawtucket sales manager, who wished Tommy success. The latter turned to J. G. and remarked it was a mighty fine thing the employees did in giving that farewell party. "And

"Just a moment, Tommy," chuckled that sedan is a beauty—"

J. G. "Have you analyzed the why of the car?"

Tommy scratched his head and admitted he didn't, although J. G. had schooled him in analyzation.

But Del Hawkins was interested and when seated in the Pawtucket six with J. G. on the way to the station he said: "What is the fourth dimension, J. G.?"

"Well," drawled J. G., "Tommy is going to sell Providence trucks in the Pawtucket territory, isn't he?"

The factory representative admitted such was the case.

"Well," continued J. G., "he will be riding around seeing his prospects in that car, won't he? And as Tommy is selling trucks only it might happen that some of those farmers up there might get the idea that the Pawtucket passenger car might be a good one to buy, seeing that Tommy has one. What?"

An Old Timer With Young Ideas

GAZE upon Thomas J. Foster, of Guthrie Center, Iowa, probably the oldest automobile and motor truck dealer in that great state. And, incidentally, one of the livest. Mr. Foster is president of Foster & Co., agents for the Reo line in Guthrie Center, and it is claimed that he has sold more Reo trucks in his territory this year than any other country dealer has sold of any make of truck in any similar territory in the state.

Mr. Foster has lived most of his long and useful life in Guthrie Center and has held more public offices than usually fall to the lot of half a dozen men in that many lifetimes. As a result he knows almost everyone in the county by his first name, and when there is a truck sale in sight he is usually the one that hears of it first—and gets the sale.

Here's just a little sample of Mr. Foster's idea of what a truck agent ought to do when the opportunity offers:

When it became known that the Des Moines motor truck dealers truck tour would take in Guthrie Center in its swing around central Iowa, Mr. Foster telephoned or went out and saw every farmer in his district to whom he had sold a Reo truck, and asked him to have it in Guthrie Center that day. He also arranged a fine dinner for the gathered farmers.

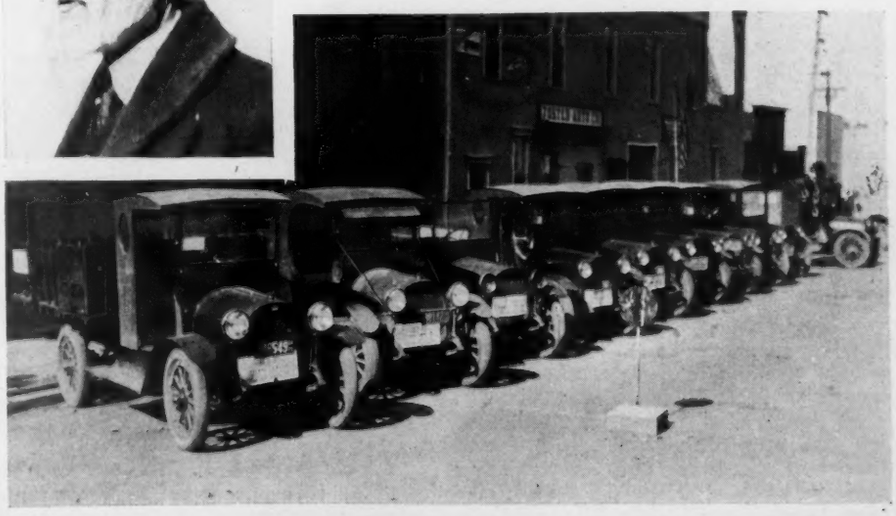
And when the caravan of trucks arrived, and the hundreds of farmers gathered from all over that section of the state to see the array, there in the street in front of the Foster place were lined up an even dozen Reo trucks which his farmer buyers had driven in at his request. And of course all those Reo owners told others of the hard work they were doing with their trucks on their farms. Rather clever sales propaganda, wasn't it?

For the other truck agents in Guthrie Center simply had to stand around the edges while "T. J." took the center of the stage with his array.

Mr. Foster believes in keeping everlastingly after the farmers, for he knows they are all real motor truck prospects. He visits them often and in between times keeps after them with circular letters, and the result is that he is educating the farmers in the vicinity of Guthrie Center to modern methods of farm hauling that are fast being adopted.

Left: Thomas J. Foster, of Guthrie Center, Ia., Who Shows the Rest of the Truck Dealers How It Ought to be Done.

Below: The Lineup of Farmers' Reo Trucks in Front of Foster & Co.'s Place of Business in Guthrie Center, Ia., When the Des Moines Truck Caravan Came Through.



American La France to Make Commercial Trucks

ELMIRA, N. Y.—It has been reported that the American La France Fire Engine Co. is about to extend its business and begin the manufacture of a motor truck for commercial purposes. This new business will necessitate the erection of a plant in another city but a great many of the truck parts will be made at the home factory.

Trucks Replace Horses on Lumber Trails

Roads, if They Can be Thus Termed, do Not Prevent Lumbermen From Effecting Savings With Motor Trucks

By J. E. PICKENS

IN the heart of the Sierras, at an altitude of over five thousand ft., sixty miles from Madera, California, is situated one of the largest lumber camps on the Pacific Coast. The Madera Sugar Pine Mills employ between seven hundred and eight hundred men, operate twenty miles of logging railroad with five locomotives and fifteen donkey engines and with this equipment and their enormous saws and mills, cut 300,000 ft. of lumber per day.

Poor Roads Have No Terror for These Sturdy Trucks
Section of road, showing spongy spot encountered at the top of a long eight per cent grade

Hundreds of men are at work at least eight months of the year, during the logging season, cutting the immense sugar pines. These trees are logged and loaded onto the low freight cars and hauled to the camp on the banks of a flume which flows sixty miles down the mountain side into the main mills at Madera.

This flume is, of course, a miniature stream of water in a wooden bed eight ft. wide, which is tressled over roads sixty-five ft. high in places and constructed at a tremendous cost.

The logs are hurried into the mills, where great saws cut and quarter them into rough lumber. These boards are fastened together with steel clamps, shoved into the stream of water in the flume and started on their sixty-mile trip by canal. At the main mills they are finished and prepared for builders' use.

These men, working so far from the source of supplies, naturally need great quantities of supplies of all kinds; the steel clamps used in securing the boards must be returned for further use; oil and lubricants, hardware and steel supplies must be at hand if the mills are to be kept busy.

This haulage over sixty miles of rough mountain trails required from ten to twelve 12-horse teams. Some idea of the expense of such an outfit may be had by multiplying the cost of one horse by 144; twelve 12-horse teams.

Mr. H. W. Shuman contracted to do the hauling with motor trucks and began to operate with two 3½-ton trucks and one five-tonner. For two years three trucks actually handled all the work formerly requiring from seven to twelve 12-horse teams. Mr. Shuman now operates five trucks. Despite road conditions which destroy a set of tires in a season of eight months, three trucks replaced 144 horses. The big saving consummated is easily understood.

Such haulage naturally put a very severe test to the motor, transmission and brakes, but Mr. Shuman says he has, after three years' experience, nothing but praise to offer for the trucks that performed in this difficult job, which only a few years ago would have been considered impracticable, if not impossible.

The Deer Park Lumber Co. at Deer Park, Washington, absolutely required 227,000 ft. of logs at their mills in two weeks. The trees were ready for cutting, but they stood six miles from the mills. The distance was not far, but that six miles represented 11 per cent. grades and very rough roads. Of course, teams could negotiate over the roads, but the cost of a sufficient number of teams to haul 227,000 ft. of logs, nearly 730 tons, in two weeks, was prohibitive and besides they were hard to secure.

Consequently, acting on the advice of a confident truck salesman who knew his trucks, Mr. A. J. De Spain secured a contract with the Deer Park company to haul the logs with trucks in that line. De Spain put two 3½-ton trucks with trailers to work and each truck hauled 3052 ft. of logs per trip, a load of nearly 13 tons. For two consecutive weeks both trucks kept at it, making four trips daily, and completed the big task of hauling 227,000 ft. of logs in that time. Needless to say, the trucks have now replaced all teams on this work for the Deer Park Lumber Co.

The Gardner-Wooley Co. is cutting an immense amount of white pine on the slopes of Mount Spokane, Washington. This lumber is hauled to Mead, thirteen miles from Mount Spokane, where it is

Termination of a Six-Mile Haul Over Eleven Per Cent Grades and Very Rough Roads
This load constituting approximately 3052 feet of logs, nearly thirteen tons, is carried by a three and a half ton truck and trailer

used for match block stock. Part of the pine is hauled green and this weighs 4½ lb. per ft., the partly dry pine weighing 3½ lb. This hauling has been turned over to three men who are operating three trucks of 3½-ton capacity and trailers, as teams have proven inadequate to cope with this task, as the quantities of match stock required are large.

Herbert S. Dale has been hauling 3346 ft. of the green pine, a load of seven tons, per trip; R. E. Arnold hauls 4406 ft. of partly dry, a load of eight tons, and W. A. Riggin takes 4192 ft. of part dry and part green, a seven-ton load.

The road is rough and hilly, some 12 per cent. grade and has several soft places, but the trucks make three trips, thirteen miles one way, every twelve hours. Thus the three trucks average 11,944 ft., 22 tons, per day. Another big job handled efficiently by trucks.

Mr. Geo. S. Morris is doing haulage work at Plains, Montana, that is truly remarkable for a truck. He operates two 3½-ton Federal trucks with Universal trailers, making various hauls of green ties, green logs and dry lumber. For instance, when hauling ties the trucks make three round trips daily, hauling nine miles to Plains and carrying 132 green ties or apparently 22,000 lb. This means fifty-four miles daily over rather rough roads.

Then, when hauling logs the trucks take 4600 ft., 23 tons, hauling this big load two miles, 500 ft. of which is down a 45 per cent. grade, and make ten such trips daily. The logs actually weigh 10 lb. per ft. and each oufit is hauling an average of 46,000 ft. or 230 tons daily. Recently one of the trucks brought in 4945 ft., almost twenty-five tons. It is, of course, unnecessary to point out the number of teams required for such haulage. Even on the two-mile short haul the trucks are thoroughly efficient.

This lumber haul is nine miles one way, and the trucks take 10,360 ft. of the dry lumber, making three round trips daily. Wing & Evers are making a similar haul with a like outfit, taking 7600 ft. of short lumber nine miles into Colville, Washington. This lumber averages 3 lb. per ft.—thus a 11.4 tons load.

The cutting of lumber for staves is an industry in Arkansas that has tenaciously stuck to team haulage. Road conditions have had a great deal to do with this policy. For instance, the mill of the Wm. F. Rapp Stave Co., at Pine Bluff, is located eight miles from the railroad. The road goes through the woods with several hills of eight per cent. grades and with deep sand deposits at the foot of each hill.

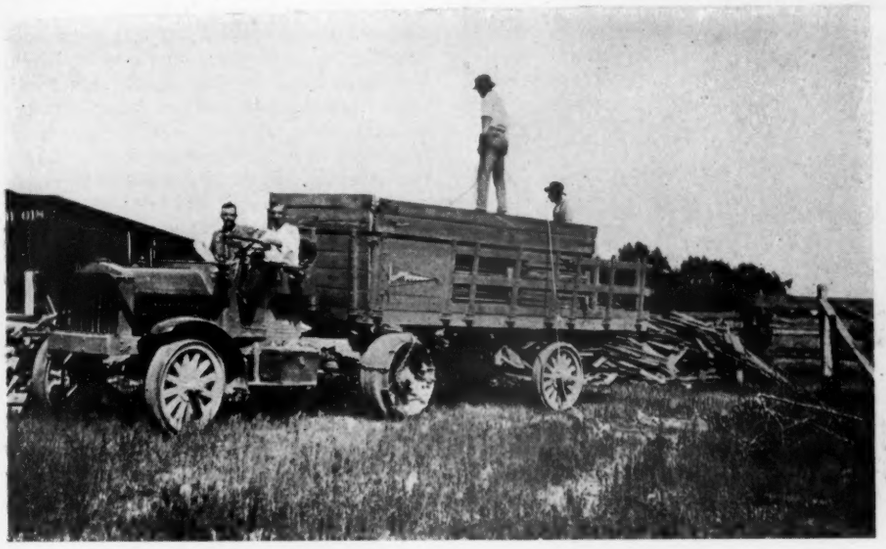
Within the last few months a demonstration made by the Paige Co. of Little Rock with a Federal heavy-duty road tractor and six-ton trailer convinced the Rapp company that truck haulage was possible and now the road tractor is working on the job every day. The rear wheels of the road tractor are equipped with Foley traction rims, which give better traction in soft roads and sand beds.

The following comparison of the work accomplished between that of the teams and that of the road tractor show the superiority of the latter equipment:

Equipment	Team—2 horses	Tractor
Staves per load	300	1,560
Weight of load, tons ...	1.2	6.24
Trips per day	1	5
Total staves per day ..	300	7,800
Total tons per day	1.2	31.2
Miles per day	16	80
Total staves per week .	1800	46,800
No. of teams required to do the work of tractor	26	

The road tractor has had no difficulty doing the work of the twenty-six teams, thus eliminating the expense of fifty-two horses, twenty-six wagons and twenty-four drivers. This is a rather remarkable replacement and the Rapp company is very much satisfied.

When we think of the work these and many other trucks and road tractors are doing, replacing many teams, doing the work of a great number of horses, we cannot but see that the motor truck has opened a new era in the transportation of lumber, logs and staves. Their influence is felt and appreciated even in the districts where the going is difficult.



Federal Heavy-Duty Road Tractor and Trailer

Unloading 1560 staves, after an eight-mile run over soft roads and sand beds. Traction is facilitated by the Foley traction rim equipment

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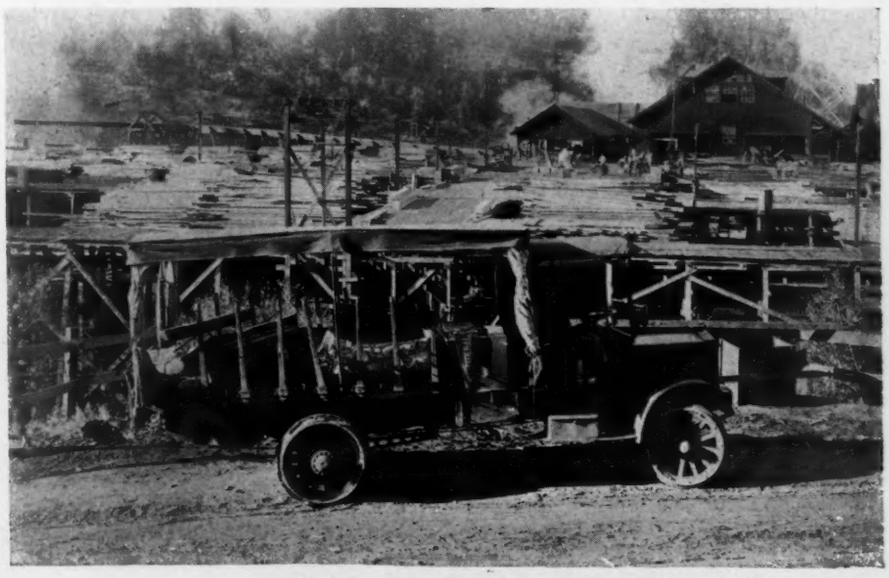
Anderson Motor Co., Rockhill, S. C., has purchased 175 acres of timber near Sharon. It has also purchased a complete saw mill outfit and plans to prepare the timber to be used in making the bodies for its cars. That, unsuited for body building, will be sold for fire wood. It is estimated that this tract will supply the company with lumber for one year.

Paige-Detroit Motor Car Co.'s production for the first six months of 1919, was 6120 passenger cars and 164 trucks. As a result of increased production facilities it is estimated that the company will turn out between 16,000 and 20,000 passenger cars in the course of the year.



Glimpse of the Madera Sugar Pine Mills

Trucks satisfactorily convey supplies over sixty miles of rough, mountain trails to interior lumber camp

Truck Efficiency Increased by Novel Loading and Unloading Appliance

Keeping in close touch with the cost per unit of handling goods has enabled the Willcox & Gibbs Sewing Machine Co. to devise helpful labor and time-saving methods.

This Small Crane is so Appropriately Located That It Commands Any Part of the Truck Body

This firm operates from its New York office nine trucks—seven Macks ranging from an AC of 5½ tons down to an AB 2-tonner, one G. M. C. of ¾-ton capacity and a rebuilt Locomobile touring car to carry ¾ ton.

Willcox & Gibbs, whose plant is in Poughkeepsie, discovered that time and labor could be saved by having an assembly plant for some of their model sewing machines in New York City. Accordingly, when plans had been laid for their garage in New York they decided to use the upper floors for assembly rooms. No time is wasted by trucks going back and forth from the shop to the garage morning and night. Parts are brought in by trucks from the freight terminals and in many cases direct from the factory 88 miles away.

In connection with this trip it is interesting to note that as there are a number of bridges to be crossed en route, the headroom of the smallest being 10½ ft., the ceiling of the garage was made with the same headroom so there would be no possibility of stacking goods on the trucks too high only to have them torn off a few hours later by a steel girder.

As the trucks pull in and stop at the elevator they are unloaded by a simple and ingenious crane. It was designed by F. L. Mitchell, manager of the truck transportation department. The crane is operated by one man and can easily lift loads up to 1500 lb. The power is obtained from a 3-hp. electric motor. The carrying arm moves in an arc which swings directly from the center of the truck to the platform before the elevator. In this way the crane can unload the goods in the proper place while the elevator makes its trips. It does the work of four men in one-quarter of the time and does away with the use of skids, rollers, bars and the usual paraphernalia employed in the unloading and loading of heavy articles from trucks.

So useful has this crane proven that Mr. Mitchell has designed a smaller one for use on the truck itself, capable of lifting from 1200 to 1400 lb. This is mounted on the side of the body where it can be swung back out of the way. Its position near the tailboard enables it to lift a load from any position within range of the radius of the arm and place it well forward on the truck. Tests have proven that a truck can be loaded with drums of oil weighing about 400 lb. by one man more rapidly than two men could load it by rolling the drums up on skids, which is the usual method. At first glance it might seem to be an advantage to have this crane power driven, but hand labor in this case is actually an advantage in addition to being cheaper as to initial cost, installation and upkeep. This crane is a one-man crane. From the position of the handle the operator can see where he is depositing his load. It has been found that a pair of grapple hooks will hold a load of almost any shape or size and only very heavy loads require the use of a sling.

The heavy-duty trucks are used for hauling material to and from the factory and in assisting the 2-tonner to handle the freight to and from the freight terminals. The smaller trucks of ¾-ton capacity, and some times the 2-ton trucks, are used in making deliveries to purchasers in homes and factories in the city and adjacent suburbs.

A careful eye is kept on the running of the trucks and they are maintained to give the utmost performance at all times. The policy of "run her as long as she'll run" is not favored here, for it is realized that prevention is cheaper than cure. It has been found that one good man is all that is needed to keep the fleet in perfect running condition.

A One-Man Crane That Can Easily Lift Loads Up to Fifteen Hundred Pounds. Does the Work of Four Men and in Less Time

Salesmanship is the Practical Interpretation of Psychology

Sales Plans and Principles Which Have Proven Producers

By A. J. AMOS
Sales Promotion Manager, The Garford Motor Truck Company

LIKE mushrooms motor truck companies are springing up overnight. Many of the lives of such organizations are short lived; they live in depth and breadth rather than length. As a tree is of no use without its branches, so is a motor truck company completely paralyzed without its line of good distributors and dealers. They are really the business builders; and it is as important to them that they represent a reputable truck, as it is for the motor truck company to investigate the financial physique of an individual dealer. Upon the efforts of the company's dealers depend the output; financial showing, and reputation it enjoys.

The dealer has his own part to play, and as evidence of interest is of two kinds—promises and performance—his productive selling energies have to be proved. Most dealers, however, are willing to work; they are willing to co-operate with the resources behind them, and capture their share of the results. Their ability to put over big deals is merely putting their physical powers, their health and their ambition to work behind their brains.

Points of Actual Experience

The sales plans and procedure as outlined and advocated in this article, I have unquestionably **proven** to be **producers;** by these principles I have **stimulated reputation;** and have **created new business** involving in many instances many thousands of dollars. This article contains concrete evidence of my own, as well as the experience of those very well known to me. The incidents referred to, and all examples throughout the article have been actual experiences staged in America, Great Britain, France, Spain, Italy, Switzerland and the Netherlands. My experience has convinced me that there is a universal principle underlying the science of salesmanship; but, as in other things, results can be arrived at much quicker in America than in any other country. There are many men in the United States, however, who require to be "played up to" with the same degree of diplomacy as in any other country.

Whether it be in the warmth of Southern Europe, among the aristocrats of Great Britain, the alertly wise of the frozen regions of Canada, or the plutocrats of America, every man is a law unto himself, and each demands an individual diagnosis.

Motor trucks are not bought; they are sold.

If all the motor truck showrooms depended on sales to casual passers-by, ninety-nine per cent. would go out of business. The ultimate recovery of the remaining one per cent. would be doubtful—very doubtful—and grave fears would be entertained for their financial safety. The demand for motor trucks does not exist; it must be created; and this can only be done by the salesman. There is a necessity for motor trucks, but not a demand. Consequently the greatest difficulty and conundrum to be faced by motor truck builders and manufacturers is not the design and construction of motor trucks, but the sale of them.

Original Demand is Created

Psychologically permit me to ask you of all the inventions in this world how many were in demand—real demand? How few of our own day and age believed that men would fly to and fro; that the Atlantic would be crossed in sixteen hours—that the world would enjoy wireless telephones—that medical science would gradually abolish drugs, and countless other things, all inventions in their own sphere. The public must be educated to the abilities and capabilities of motor trucks, and the special merits and virtues of individual makes. The future of the motor truck depends upon the co-operation between the manufacturers, distributors and dealers in building, in every possible way additional markets. This can only be done through the appreciation of the true economic value of the motor truck as now experienced in commercial transportation, and the promotion of its use for such purpose. The rural motor express is in its infancy, but its development means possibly more for both the rural and urban population than any other method of commercial transportation. Here the motor truck dealer has a virgin field.

Salesmanship Like Unto Psychology

Many worthy motor truck companies are realizing that selling is a science, and that salesmanship is the practical interpretation of psychology. As psychology is the acute activity and operations of the intellect, salesmen to be successful ought to be educated along those lines. This only demands that a man be acute in observation, conception, reason, judgment, genius and understanding. Then and then only is a man capable of matching his mind against those with whomsoever he comes in contact.

The days have gone or rather fast going when men revert to selling as a temporary means of making a living. A dispensing chemist must qualify to be permitted to safely dispense medicines. A druggist does not want to kill his customers, who are the mainstay of his business. Why employ salesmen who do not know the first principles? By not knowing how to put over a particular deal the salesman is very liable to kill the sale.

As a chemist is demanded to have a standard of education in chemical science to be permitted to "make up," so should a salesman be demanded to have a standard of education in psychological salesmanship and know how to "put over."

Salesmen must be educated on their various truck models; they must be informed of the details, and their own individuality combined with this knowledge is sufficient ammunition to be effective. They must be educated psychologically and technically; their arguments must blend; their propositions must compare. How many times we come across two men, each selling the same truck for the same organization, but different propositions and prices. To a real, clean-cut business man the motor truck organization which encourages such procedure is sawing the branch on which it is sitting.

Prospects Are Not Inanimate

Mr. Salesman! Don't fool yourself if you imagine you are the only one with whom your prospect is discussing trucks; he is doing it with his friends, his brothers in the same class of business, and around the poker chips. He knows more about you perhaps than you would care to admit. There is a strong bond of union among your prospects. Whether it be motor trucks or cigars the salesman must be educated to abide by the policies, propositions and prices of his house; if sales are to be made and kept. To keep a truck sold is sometimes harder than the selling of it.

Motor truck manufacturers and builders would do well to follow the good examples set them by their friends in the rubber business, namely, The B. F. Goodrich Tire and Rubber Company and The Goodyear Tire and Rubber Company. In each company every salesman is required to attend the "school" annually for a period of about three weeks, during which time he is examined, brushed up and instructed in the latest methods of selling Goodrich or Goodyear products as the case might be. They are also taught how to psychologically interview prospects, and with one end in view: to sell their products. Such organizations as I have just mentioned are known the world over, by reason of their extensive sales organization, **and the basic principles on which they sell.** There is no alternative; results always follow education and experience.

How many sales managers ever instill into the minds of their salesmen that they

ought to fortify themselves with particular information regarding their prospects before setting out? No doubt they mean well, and meant to do it, but, the graveyard of good intentions is full up with those who meant to do, but failed. The experienced and successful salesman studies his prospect—his manner of doing business—if he is curt, conservative or open—if he is of the old or new school—if he is one of those "too busy to see you" kind—if time makes any impression on him—if he is a talker or a listener—his hobbies and eccentricities. Salesmen ought to be taught to visualize their prospects. This done the salesman can set out confident in himself of his man—ready to meet rebuff with courteous reply—a witty answer for the cynic—a story for the witty—an appeal for the eccentric.

Stock Up With Evidence

The salesman believes he has a good story to tell about a good truck—at least he ought to believe this or quit. Such the case he ought to be ready "on the word of command" to "show his hand." Sometimes a man has a reputation as a pugilist and great defender because his bluff has never been called at any time. Your bluff will be called—not always—but be ready for the emergency, which, after all, is your opportunity to convince.

A salesman who goes out to capture a "live one" with a case of disarranged, soiled and torn literature is like unto a man who goes out to shoot grouse or pheasant without cartridges—he is out of luck. What looks nicer than a neatly arranged portfolio, where everything is in its place, and there is a place for everything? A well bound, well stocked photograph album, arranged for ready reference, and cross referenced if necessary—always clean, without frayed edges—conveying the idea: "Many have been the thousands viewing these pictures ahead of me." This form of evidence is always an asset; it impresses and convinces the small man, and is in sympathy with the big man's ideas.

It is true there must be some method of carrying around this collection of **circumstantial** evidence, but, if possible, it ought to be inconspicuous. A suitcase of pamphlets, folders, catalogues, etc., takes away the dignity of the house a salesman represents. I know salesmen who in winter conceal their small portfolio under their coat, which they carry over their arm when entering a private office, and on other occasions conceal it behind their hat in hand. It is easily done and conveys a good first impression. I have witnessed the look of astonishment and smile of appreciation on more than one prospect's face when from beneath the hat on his desk came forth the whole story.

This photograph evidence has been greatly overdone—too many are inanimate in appearance—in that I mean they are not shown in action. What does a contractor care about a photograph showing a real good "dump job" sitting in front of a showroom or a service station? He would go into raptures about a truck deep down in an excavation being loaded by a steam shovel, and over the page another photograph showing the same truck up to the axles in mud pulling this load up a very steep grade. This is evidence that brings him out of himself and gives the salesman a lead.

Testimonials are good, but not four and five years old as I have sometimes seen. This, too, however, can be overdone by showing a man in New York City a fac-simile letter from a man in San Francisco. The prospect naturally asks who are operating your make of trucks in New York City, and if your organization is as big as you represent, surely, you have owners in New York. Of course, you have. Then why in thunder show him something from San Francisco? The salesman should make his evidence **circumstantial;** make it effective.

Well I remember that as a boy brought up and nurtured in a rigidly righteous environment I was taught to believe that clothes do not make the man. That sounds very nice and we all know is undoubtedly true. However, it cannot apply to a salesman, for the simple reason that it takes too long to find out that under a fast approaching gray blue suit there beats the heart of a genuine man—whose character is beyond reproach—and whose word is his bond.

First Impressions

A successful and effective salesman studies to look his best when appearing before the "powers that be" of a big orers would do well to follow the good exganization. Men of authority invariably arrange their private office in such a way that the party immediately upon entering comes face to face with the man behind the desk; the visitor has considerable distance to walk before being requested to be seated. In this interval the mind reader or psychologist has the upportunity of "sizing up" his visitor. I have seen a man step into a private office with all the frontage and fortification apparently possible, but the silent grilling he encountered while walking across that Wilton carpet shattered his pseudo frontage. The man in question positively quivered and wilted like a rose or a lily out of water, because his motives did not ring true, and he knew it—he was conscious of it—and he knew that the hawk-eyed man behind that long flat glass topped desk also knew it. He was a financial crook. Be prepared for such a grilling; live clean—look clean—act clean—and you have nothing to fear.

Mr. Salesman, First Sell Yourself

If a salesman fails to sell himself he cannot make the sale; no matter how good, how strong or how economical his trucks may be. The prospect might like the truck, but his desire was not created by the salesman who failed to sell himself. The prospect might buy the truck, but through another man. The salesman having fortified himself with good reliable information about his prospect knows how to make his approach. He cannot sell a man from the outside; he must do so from the **inside.** He must appeal to his prospect. He must get him in the right frame of mind. He must get him in the environment particularly agreeable to him.

A salesman is judged by his personality; whether his manner be refined or plebian, his habits clean or unsightly, his language the epicure of breeding, his conversation the emblem of education. The salesman must avoid all slang. One feature which is of outstanding importance for all classes of business is courtesy; it costs nothing to carry around; when invested it invariably yields good financial returns; it demands respect from the rough and ignorant, and is a passport to the innermost crevices of resistance of those in authority.

Play Up to Your Prospect

The motor truck salesman who starts in by talking "truck" is doomed to fail; he is too quick an actor. A salesman must play up to his man, but first find out all that is in him. The practical application of education is most common in conversation. To suck from the other fellow in conversation the degree of his mental ability and brilliancy is an enviable faculty. A man who is reticent in speech can invariably be made to come out of his shell by turning the bow of the conversation to his home town; the pictures on his walls, his business, to anything but motor trucks. Do not forget, however, that sometimes silence is the fraternity yell of the college of experience, and that your man might be financially interested in a motor truck company, and is letting you spend yourself. Psychologically he might be controlling you.

The talkative and effervescent type of man can usually be made to sell himself; he talks himself into shape for your ultimate proposition. Successful salesmen must be students of human nature; readers of men and of character.

I have witnessed many salesmen hang themselves in their conscientious endeavors to sell themselves, because they lacked self-control. That is a predominating factor in all branches of salesmanship. Immediately a man loses control of himself in business he is adrift on the seething foam of the ocean of the great unknown. The master man is after all the man who is master of one individual—himself. A cool head, a clear mind amid a Niagara of infuriated and frenzied torrent of speech draws from your prospect admiration of the deepest dye. Those blustering, bellowing hyenas behind roll and glass topped desks instead of iron bars, whose spasmodical temperament causes many to live in awe of them, are after all the easiest people to sell—they sell themselves. They are a snap—to a real salesman.

Once a salesman permits himself to be sidetracked he is hopelessly lost; he is dead timber on his company's payroll. It is only by concentrated intensive energy that a salesman can ever expect to succeed, and be a real producer. A prospect respects the ability of a salesman **once he knows him.** He will pass up

other salesmen with perhaps better trucks at comparatively better prices, because he has become deeply rooted and interested in this particular salesman—not as a representative—but as a man. He **honors** his ability and collectiveness. He appreciates this salesman's flashlight condensation of the whole situation. He is selling himself the salesman's truck.

See Yourself From the Inside

There is a time for everything in this world, and as one great poet wisely put it: "There is a tide (time) in the affairs of men, which taken at the flood leads on to fortune." How few assimilate the fullness of thought, depth of meaning and innumerable translations of these few small everyday words. How few consider **seriously** that to a business man TIME MEANS MONEY. Take as concrete examples salesmen known to myself who have prospects, small teaming men, shivering on the brink with fear to launch away. They invariably suggest that the salesman call after six o'clock when they will have more time to talk and go into details. Such a man has no time to fool away during the day. Big men do not do business that way, but their creed is exactly the same; neither are they waiting for the salesman's card to be brought in.

I cannot emphasize too strongly that psychology is the basis of successful salesmanship. The more a man thinks of this fact, the more he will realize it. With big men it is customary in America as in Europe to telephone and make an appointment with the executive's secretary. It is not only conventional and in keeping with the atmosphere big executives breathe; it is strongly advisable. The secretary is a good medium through whom to work; he is a reliable barometer, thermometer and elevated bell boy. He is the gateway; through him all things come and go.

Why call on a busy business man on a dull day and expect a cheerful reception? It can't be done. Is the salesman selling joy or gloom? A man never has a sufficiency of joy, but, a salesman cannot sell a man gloom, as he is overstocked; he makes it on the premises. You can only sell a man when he is in the spirit; under the influence if you so care, and it is up to the salesman to administer the dose. Many have challenged and criticised me on my views regarding the proper time to interview a big prospect; views I have personally **tried out** and **proven** to be practical. Challengers have told me that in the case of contractors, a wet day is a good time to find them "in," and free to talk truck equipment. Maybe, there are exceptions to every rule, but the percentage of exceptions is so small that it is not visible. If a contractor takes a contract to complete a structure in a specified time at a specified price, it is very evident, and only natural, he estimated closely on his labor, equipment, raw material, etc., knowing of his competitors, and to stand a show of being awarded the contract. The excavation or structure is making wonderful progress, but there comes a sudden rain storm which lasts for several days; he cannot work his men and equipment; and to him **TIME MEANS MONEY.** When he does resume operations he knows he will have to go over a great deal of that which has already been done. The work of another day or so before the sudden rain storm would have placed the structure at a stage beyond danger point. He knows this extra expense will cut down his profit. Yet! Many think a wet day a grand and glorious opportunity to interview a contractor with a view of interesting him in the investment of additional motor truck equipment. It is not feasible. It is not practical. It is not human.

I have seen many sales involving hundreds of thousands of dollars, wafted to a salesman's competitor by his calling at the wrong time. I have personally taken an order amounting to fifty-one thousand dollars from a competitive salesman; because I studied the situation and knew my man. I postponed my appointment; my competitor persisted in keeping his. He was unquestionably in the lead, but, by lack of judgment on his part, he lost. The old gentleman related the whole affair to me and laughingly told me he had been "nursing his wrath to keep it warm." An undesirable condition and frame of mind in which to find a prospect! This is only one incident I have experienced and know of many others. I also have experienced that adversity instructs and that too often prosperity deceives a salesman. Think it over.

Make Your Visits Timely

Take Saturday morning as an example; does a man want to be pestered by visitors when he is endeavoring to get off as many letters as possible before one o'clock? Would you, as a business man, appreciate the unexpected call of a salesman whom you had not previously met and in whose product you are not interested? The mere fact he came on a Saturday morning when you had neither the time nor the inclination to even give him a chance to interest you, leaves him no argument upon which to base a return call. I have tried it in America; I have tried it in Europe; I have tried it in Canada, and in every instance I have **proven** it is **lost motion** and **wasted energy.**

Mr. Salesman, never interview a prospect unless you feel healthy, or your mental ability will be much depreciated. Make the morning shave as standard as the washing of your face, otherwise you will not get farther than the information desk. Be well groomed. Let me impress upon you a motto I believe every salesman ought to adopt. It has proved of value to me, and I am sure by your adoption and application of it the same measure of success will be your reward: **Think clean—Live clean—Look clean—Act clean.**

Sell Yourself on Your Organization

In all manner of purchases, be they great or small, there are predominating fundamentals which actuate the prospective purchaser, and of these **organization** plays the biggest role. Men consider the financial physique of a company, its abilities to accomplish things worth while, its vision and capabilities as to the future, its status, and the influence and reputation it enjoys through the medium of its personnel throughout the world. Here the salesman has the opportunity to "star." Here the salesman is meeting his prospect on his own ground. Who is back of your company? What are you capitalized at? These are typical questions which the average business man will ask, and which the salesman has to satisfactorily answer. The salesman must not only answer his prospect satisfactorily—he must do so **convincingly.**

Force, Sincerity and Aptitude—Requisites

Knowledge is power; the salesman must convince his prospect by the dynamic force of his answer that his statements are unquestionably true. Business men can tell when a salesman's statements are subject to ramifications. The prospect must be impressed by the apparent sincerity of the salesman's actions, and made to realize that his delay in decision is his financial loss. By apt statements and ready answers the salesman ought to show the prospect that he is convinced he is working for the **right company** with the **right product.** A saleman's arguments are of no avail without authority and illumination.

Nothing is sold nowadays without service; from department store goods to the costliest machinery. This is a big talking point, but deeds talk louder than words. Remember! In many instances **service precedes sales.** The question of service is usually a delicate subject to discuss with a prospect, as two men never think alike. A company might render the best possible service, but a prospect's friend might have been disappointed in a promise of estimate, time to make a repair, and operating co-operation generally. Service can either make or mar a sale. Service is a "talking point" that a salesman ought to leave to owners in the vicinity; friends of the prospect's, and to the truck itself. One good truck on the road is worth considerably more than a full spread advertisement published broadcast. If a prospect has a service grievance he will use it as a bulwark of defense; then, and then only, is the time for a salesman to talk "service," and do so in a manner that will turn the prospect's disadvantages into advantages. The good testimony of an owner is many times more valuable than a good salesman's argument. **Good service creates business and holds customers.** How many salesmen can truthfully say that when the occasion arises? Be courteously convincing; avoid exaggerations; never use the superlative. Other trucks are good, perhaps better, but a salesman is not selling the other fellow's trucks.

By this time the salesman has either created or killed the sale; unquestionably so. He has, however, successfully received **attention;** aroused **interest;** created the **desire,** and now to get the **ACTION.** After all, the only thing that counts is the **ACTION.** The salesman is hired to produce—to get the action. However, seventy-five per cent. of his

time is consumed in **traveling to ACTION POINT.** Without touching in this article on the inestimable value of successful sales letters, and the power of the written word, this traveling expense has to be endured. April third, nineteen fifteen, I sailed from New York for Liverpool on the Lusitania, and during the voyage I became very friendly with a Professor from a prominent dental college in Boston. We exchanged many ideas. One morning when talking of a dental curriculum he made this statement, and one I will never forget: "The last thing we teach a dental student is how to pull a tooth." That is the climax; the apex of professional information imparted to the student. **Action is the final step;** it is the most important; it is **all importance.** The reputation your truck enjoys is the guiding star of your propect; he is guided by what "they say" of your truck.

A salesman must know his truck, not as a mechanic, but as a **salesman.** A good mechanic makes a poor salesman. How often I have seen the realization of the aspirations of a mechanic to become a salesman result in his desperation for his drawing board and bench. We are in the age of specialists, and a man must either be a **doer** or a **teller.** The mechanic may be a successful **doer,** but a bad **teller.** The good salesman is a successful **teller,** but is not usually a good mechanic or **doer.** Man cannot specialize in two things; he may be a specialist in one, and have a good general knowledge of the other, but he certainly cannot master both. Consequently we daily experience that good **doers** are proving themselves miserable failures as **tellers.** Many men are misplaced: they are misfits. A successful motor truck salesman has a general knowledge of motor trucks, and should exhibit a willingness at this point to answer any questions in his power regarding his truck. A prospect who tries to "stick" a salesman on mechanical detail is only further selling himself on the specialized strength of the organization behind the truck. He is unconsciously assuring and impressing himself that this is the right truck to buy. At this juncture the salesman has a glorious opportunity of emphasizing the **specialized quality** of his truck to the limit of his knowledge. A salesman ought never to allow himself to become entangled in mechanical details. The company employ skilled designers and engineers for the purpose of debating such questions. Leave such details to them: they are the **successful doers.**

The Price

No mention has been made of price, why should there be? Is the prospect buying the price or the truck? At this stage he is **convinced** that the truck will make money for him; it will be his business builder. Let necessity predominate, and the prospect will find his level with the price. Too often the price is leveled with the prospect. A salesman should steer clear of the price throughout his interviews: it will not help the sale any. Motor trucks are not neckties.

Here the salesman sums up his strongest arguments in a **convincing** and **illuminating** manner. Here the salesman also suggests a thought which is as the sparking plug in the engine; and by reason of its radiating influence it sets other thoughts and ideas in motion. His goal is now to get the prospect's signature on the "dotted line"—it is only a matter of time—but at last! He has won that extra bonus.

Special Body for Buick Delivery

The hauling of bricks from railroad cars or from kilns to the job ordinarily does not present much of a problem, but the Illinois Brick Teaming Co., of Chicago, found that contractors in that city insisted on being able to count the bricks by figuring the number of rows and the number in each row. This was a problem, because it meant that bricks had to be put on edge, piled one against another in rows.

The solution was the installation of a Mack AC dump truck with specially built removable sideboards. With this truck, the bricks can be loaded from either side by taking the boards off and walking from the car into the truck body.

Million Dollar Motor Truck Express Company Begins Operations

The ship-by-truck movement has evidently passed the stage of experiment, for large companies with extensive capital may be found in many sections of the country.

The Patriot Motor Express Co., of Wichita and Kansas City, Kans., the first million dollar interstate motor-truck express company, has begun transportation through Kansas, Nebraska and Missouri. Its first routes are between Atchison and Kansas City via Leavenworth and other intermediate points, and St. Joseph and Kansas City. Trains of two large motor trucks each will make trips every day regardless of weather conditions. In cities the trucks will stop at the loading docks and warehouses of wholesale concerns, and will pick up grain, livestock, and other farm products from farmers along the route. The company for the present is running one line between Atchison and Kansas City, a distance of about 75 miles and two lines between St. Joseph and Kansas City, a distance of 25 miles.

The personnel of the company is composed of mechanical engineers and transportation experts of Chicago and Kansas City. Officers of the company plan to open temporary offices in Kansas City.

The three lines now in operation are but a few of the many lines contemplated by the company. Within the next six months it will establish freight and express lines operating between all of the principal cities in Kansas, Nebraska and Missouri, using about 250 large motor trucks.

The company has decided to erect or secure large fireproof modern freight and express warehouses. These will be erected in the larger cities of the three states in which the company will operate.

Your Part

Ten years ago, ten thousand trucks
  Hauled goods from street to street;
Today, five hundred thousand
  Make the nation's mighty fleet.
Increase at this velocity
  In ten short years would mean
Some twenty million motors
  In our transportation scheme.

To make this a reality
  Is up to you and I—
The past has proven that we can,—
  And figures never lie.
In the words of Teddy Roosevelt,
  All men should feel they owe
Some time to their profession,
  If they want to see it grow.

What part is yours to take and play
  In this aggressive game?
It's in your power all the while
  To give the truck more fame.
The maker, dealer, salesman, driver,
  Owner of a fleet,
And everyone that transports goods
  Will make success complete.

Reduce costs to a minimum—
  Don't send out half a load—
Enlist the driver's firm support,—
  And keep them on the road.
Cry out the slogan—"ship by truck"—
  Till every person sees
That on hauls long and short
  The truck has real economies.

But first and last and always,
  These economies depend
Upon good roads, and without them
  Development will end.
Do all you can to boost good roads,
  Then hustle to prepare
To reap the profits of success—
  Because you've done your share.

—P. L. Sniffin, International (Mack) Motor Co.

View of Patriot Trucks Sold to the Patriot Motors Express Lines
This company has contracted for an order of one hundred and fifty trucks, of which the above are a part of the first twenty-five

Constructing and Maintaining Streets and Roads

Motor Trucks Need Good Roads

Speedy Road Construction Methods

By J. E. PICKENS

THAT parody on the song "Smiles" fits right in here fine. Perhaps you have not heard it—the ending of the chorus is "But the Only Road We Give a Darn for—is the Road to Prosperity."

That states concisely why we want good roads,—good roads built for heavy traffic and kept in shape thereafter—because good roads **are** the roads to prosperity.

True, the sturdy motor truck has managed in many places to negotiate the mud and sand roads, but good roads are such an aid to better profits and lower haulage rates, that they are essential to true prosperity. Realization of these poor road conditions and appreciation of the value of better roads has resulted in the utilization of motor trucks not only in speeding up construction of good roads but to keep them fit for service thereafter.

The work that is possible with a good truck when properly handled is sometimes astonishing and the great difference between road building speed with motor trucks and with horses is remarkable.

One day last summer W. F. Kahler, Highway Superintendent of Pulaski County, Indiana, unloaded eighty-five tons of stone from a railroad car and spread it on the roads—and it was only a two-ton truck. A driver and three shovelers were all the labor used. Two such trucks keep the county stone crusher busy, hauling all stones five miles. From seven to ten such trips are made in two hours.

Then, when needed the trucks pull a scarifier, either alone or in tandem, when on heavy work. An eight-foot blade grader is easily pulled thirty miles a day. In fact, Mr. Kahler is now doing with one truck the work formerly requiring five teams.

Comparative Gravel Haul

Tom McWhirter, Commissioner in Ellis County, Texas, recently tried out a team and a truck on the same work. He found that:

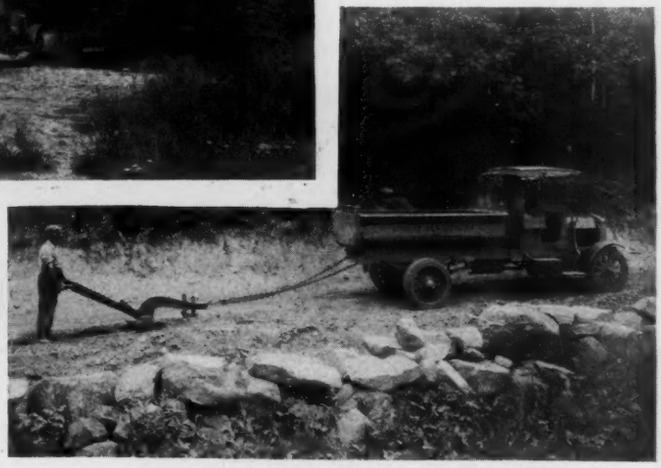
	Team	Truck
Length of haul—miles	5	5
Yards per load	2	2½
Trips per day	1	5
Total yards hauled	2	12½
Cost per day	$4.50	$9.32
Cost per yard	2.25	.75

The truck then will do the work of six teams on this work at a saving of $1.50 per yard hauled.

When unloading cars of gravel Mr. McWhirter found that one truck would unload four cars of gravel,—120 yards—in eight days at a cost of $74.56. One team was only able to haul four yards a day, thus requiring thirty days work to unload the four cars. The cost of the teams for thirty days was $60.44. This saving of twenty-two days on four cars is very remarkable and surely the difference in cost is worth while.

McWhirter adds, "There is no comparison in hauling lumber with wagons and trucks. I can put enough lumber on the truck to build a bridge, go on and finish the bridge while we are getting the lumber there with wagons."

There are just two good instances of big savings in time and money where trucks replace teams on road building work. The average saving in cost seems to be about that given by Mr. J. W. Gwin, President, Board of Revenue, Birmingham, Ala.: "We find it is from thirty to fifty per cent. cheaper to use trucks than horses and mules." Mr. Gwin in his work uses eight Federal trucks, two Macks, one White and one Packard. He also operates four tractor engines, two 30-hp. Rumely Oil-Pull tractors, one 60 hp., and one Twin City tractor.



Variety of Road Work Performed by One of the Federal Trucks Owned by the Street Department of Laconia, New Hampshire

Above views show this truck being utilized in pulling a Burch spreader, a plow, and in removing big rocks

The motor truck has proven its ability to be used in dozens of ways, both in the constructing and maintaining of roads. The Street Department of the City of Laconia, N. H., operates a 3½-ton Federal in this usual variety of work. It carries a full load of crushed rock or sand and hooks on to a Burch spreader, dumping and spreading its load at the same time. Then it is hitched to an ordinary plow and plows with a will. When a big rock is encountered a chain is fastened around it and the truck pulls it out. In the city it is used to haul ashes and waste. Some other loads consist of coal, pipe, brick and snow.

Pasadena, Calif., has a very excellent method of repairing macadam streets. A two-ton truck with mechanical hoist and dump body pulls a trailer with an oil tank equipped with a gasoline burner for heating the oil. The truck carries a yard or so of crushed rock and screenings, and the outfit goes from place to place repairing the oil macadam streets and hauling away the broken fragments when necessary.

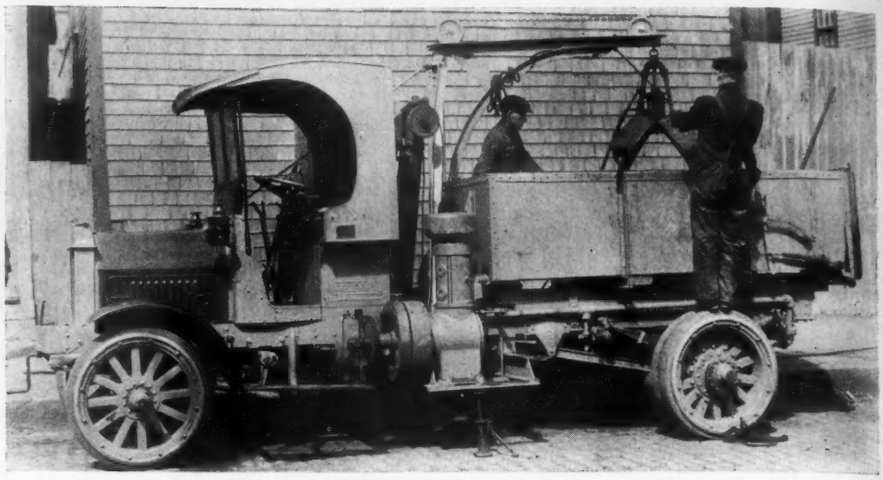
The Canon City, Colo., has a population of approximately 6000 people and the officials set about making their city the "City Beautiful" and keeping it so at as moderate a cost as possible. A 3½-ton truck with dump body controlled by a hydraulic hoist was purchased. This body is interchangeable with a 1000-gal. gravity sprinkler tank. Mayor D. N. Cooper tells of their findings with this combination:

Operating Costs Cut in Half

"As a sand hauling proposition we have in 119 working days delivered 952 loads, each consisting of 3½ yd. of sand for street surfacing, a total of 3332 yd. We have installed a Galion sand loader to increase the speed of loading. For the 119 days the truck was in operation, the entire cost of the city has been $2,121.77, or a total of $17.83 per day.

"To have hauled 3332 yd. of sand by the old method of teams, would have cost us $4998 or $1.50 per yd., a saved difference of $2876.23.

"As a street sprinkler we are able to cover about eleven blocks with one filling and on our widest streets, 100 ft. wide, we require three trips to cover from curb to curb. The service obtained is fully equal to that of six horse-drawn sprinklers of 600 gal. It is safe to say that within ten months the truck will have fully paid for itself in savings over the old methods."



This Truck is Used for Cleaning Catch Basins and Sewers
It is equipped with a steel dump body, hydraulic hoist and an elevating hoist that obtains its power from the propeller shaft

It is not always possible to secure complete reports on the operating cost of trucks in this work. Mr. S. C. Sleeper, engineer on the Luce County road commission, Newberry, Mich., has compiled the following figures as cost of two trucks during 1918:

Work and Cost of Two Five-Ton Trucks, Luce County Road Commission, Newberry, Michigan, 1918

Truck No. 1.		Truck No. 2.	
Fixed Charges:		Fixed Charges:	
Interest at 6% per annum	$228.00	Interest at 6% per annum	$288.00
Insurance (none)	.....	Insurance (none)	.....
Operating Charges:		Operating Charges:	
Depreciation 100,000 miles (truck value minus tires)	255.16	Depreciation 100,000 miles (truck value minus tires)	237.40
Total wages of driver	319.74	Total wages of driver	297.00
Gasoline, 1377 gals. @ 25c	344.25	Gasoline, 1235 gals. @ 25c	308.75
Lubricating oil, 117 gals. @ 56c	65.52	Lubricating oil, 123 gals. @ 56c	68.99
Hard oil, 128.5 lb. @ 6c	7.71	Hard oil, 121 lb. @ 6c	7.26
Waste, 20 lb. @ 20c	4.00	Waste, 21.5 lb. @ 20c	4.30
Tire depreciation, 5316 miles @ 3c	159.48	Tire depreciation, 4946 miles @ 3c	148.38
Repairs and renewals	160.00	Repairs and renewals	131.00
Operating Charges	$1,315.86	Operating Charges	$1,202.97
Fixed Charges	288.00	Fixed Charges	288.00
Total	$1,603.86	Total	$1,490.97
Performance:		Performance:	
Average haul in miles	5.54	Average haul in miles	5.54
Number of yds. hauled	1,863	Number of yds. hauled	1,780
Total number of yd. miles performed	10,321 $0.155 yd. mile	Total number of yd. miles performed	9,861 $0.151 yd. mile
Total number of ton miles performed	15,481 0.104 ton mile	Total number of ton miles performed	14,791 0.101 ton mile

View of Flusher Used by Cedar Rapids Street Cleaning Department
Dirt and refuse is blown from the street to the curb by a water pressure of from forty to sixty pounds

Two five-ton trucks operated by the City of Tacoma, Wash., secured the following results in a period covering eight months:

Month	Miles	Yds. Hauled	Gals. Gas	Pints Oil	Lb. Grease	Hrs. Running	Hrs. Care and Cleaning
April	556	607.5	215	114	10	96	16
May	2,003	2,336	694.5	318	..	300	32
June	1,998	1,871.5	737.5	440	10	348	32
July	2,027	1,412.5	740	344	..	348	40
August	1,611	738	558	258	10	241	40
September	627	467	293	116	10	130	24
October	....	....	...	...	..	...	..
November	1,230	792	469	224	10	233	32
Total	10,052	8,234.5	3,707	1,774	50	1,696	216

Cost of Operation

1,696 hrs. running (wages)	$805.60
216 hrs. care and cleaning (wages)	102.60
3,707 gals. gasoline @ 18c	667.26
222 gals. oil @ 40c	88.80
50 lb. hard cup grease @ 8¾c	4.38
180 lb. transmission grease @ 7c	12.60
5 gals. ice machine oil @ 39c	1.95
1 set 40 x 12 tires, worn out	312.22
1 pair new chains	120.00
Sundry repairs	97.75
Depreciation of truck	500.00
	$2,716.16

Thus the trucks made 10,052 mi. on 1834 trips hauling 8234 yd. The hauls averaged 2¾ mi. which at the total cost of $2,716.16 would give a yd. mi. cost of 12c. Teams on this work formerly hauled 7.3 yd. per day at a cost of $8 or $1.10 per yd. The truck hauled 38 yd. per day at a cost of $12.81 or 30c per yd., a saving of 79c per yd. and on the quantity above 8234.5 yd., a total of $6,525.84.

For sprinkling and cleaning streets, Jackson, Mich., use a combination sprinkler and flusher of Studebaker make.

Previous to the installation of this truck Jackson operated three horse-drawn sprinkler wagons capable of covering two city blocks at one filling. The cleaning of the streets was done entirely by sweepers. The new truck merely blows the dirt from the street with a water pressure of from forty to sixty lb., giving sufficient force to flush a forty-foot street, while the two sprinkling nozzles can cover an eighty-foot street.

Ottawa, Can., is an excellent example of the savings effected by these powerful flushers. The report of Andrew Macallum, Commissioner, gives the facts concisely.

"Each of our flushers has replaced ten horse-drawn outfits. Two flushers operated all of 1918, flushing an average of eighteen miles of pavement of all widths per day at a cost of $1.72 per mile. The total cost was $4650 for 150 days actual work. The teams formerly used accomplished this work for $16,800—a direct saving of $12,150. And the streets were kept cleaner than ever before."

W. P. Gillispie, Supervisor of Streets at Salt Lake City, has a similar outfit and in his report states that the flusher replaced sixteen horses, eight flushers and eight men, by working two shifts. The truck saved the city $68.50 every twenty-four hours besides doing better work. After this report Salt Lake City purchased another outfit.

The City of Cambridge, Mass., designed an especially fine outfit for cleaning catch basins. A 3½-ton truck in addition to a steel dump body and hydraulic hoist, was equipped with an elevating hoist that obtained its power from the propeller shaft. From this hoist a bucket of the "orange peel" type is suspended, having jaws which are opened and closed by compressed air. This air is obtained from a small air compressor mounted on the left side of the truck. This is also operated by a power-take-off from the shaft.

The hoist is swung over a basin, the bucket drops and jaws open before reaching the mass. The jaws are then closed and the bucket raised, swung over the body and again opened. Thus the truck motor furnishes all power for the entire operation—compressed air, bucket hoist, dumping hoist and transportation to the dumping place.

Fundamental Packard Parts Arranged Attractively on a Four-Sided Revolving Rack, Displayed in the Fisher Company's Salesroom. A Good Sales Adjunct

State-Wide Tour of Oldsmobile Trucks and Warner Trailers to be Staged

Mr. Frint, president of the Frint Motor Car Co., has completed arrangements with the Milwaukee-Warner Co., state distributors of Warner heavy-duty truck trailers, to furnish five trailers to be drawn behind an Oldsmobile truck on a 2000 mile circle trip around the State of Wisconsin. Records are to be kept of the mileage, the fuel used, condition of roads, inspection of tires at end of journey and other information pertaining to truck-trailer economy.

The truck-trailer train will be made up of an Oldsmobile truck and five Warner trailers, consisting of a 1½-ton 4-wheel trailer, a 2500 lb. 2-wheel auto trailer, a 1200 lb. auto trailer and two 1500 lb. auto trailers.

Smith Rubber Tire Co., Inc., Passaic, N. J., has broken ground for a tire plant at Garfield where it will manufacture only cord tires.

Lakeside Forge Co., Erie, Pa., are planning to enlarge their forge shop. They have just completed an addition to their machine shop and have installed a great deal of new and up-to-date machinery. These additions have been necessitated by the increasing demand for Lakeside wrenches and tools.

American Taximeter Company has opened two new service stations, one in Atlanta, Ga., and the other in Providence, R. I.

The Psychology of Selling Brings Forth Many Salient Ideas

"When the prospective buyer of a motor truck comes into the salesroom have something to show him, something to interest him," said Ellis Hunter, secretary of the Fisher Automobile Co., Indianapolis, dealers in Packard and Reo motor cars and motor trucks.

"The display of trucks is important, for trucks, like motor cars, must be shown to the best advantage in the salesroom at the time when the prospect's mind is the most receptive."

One section of the handsome show room of the Fisher company is devoted to motor trucks, as remote from the passenger cars as possible, for the Fisher company's policy is to separate the motor truck and motor car psychologically as far as possible.

On the floor of the Fisher salesroom there is always one or two models of the Packard trucks, which serve for every example of sales quality which the salesman wishes to point out.

One of the strong selling influences is that of a four sided revolving rack on which are hung the fundamental parts of the Packard truck, so arranged that quality of workmanship, strength of construction and care in design is conspicuously brought forth.

For many business men, in no sense of the word mechanical experts, this rack creates a favorable impression.

The Trade-in Evil*

IF I am expected to bring you anything basically new, I bring a disappointment. If you can be content with a new application of old principles, I have hopes. One thing new I have brought to you, and that is a determination to open up this question in a way that will break the lethargy that seems to surround it.

I want to tell you that I believe that I can prove that taking old trucks in trade at excess values is dishonest. Also that the man who takes them at excess values is dishonest. * * *

Perhaps 1 per cent. of truck trades are turned in because they are too small or in other ways unsuited. I do not hesitate to say that at least 95 per cent. of trucks traded in should be destroyed. Now, when Ignatz Irishwhiskey noses around the dump heaps and picks up an old Adam chassis with an Eve body, for which he pays $100 or $200, and trundles it into his side yard, demanding $800 or $1000 for it in trade, he is dishonest. When **any dealer who knows he is alive** and at the same time is wise to what is being put over on him, allows Ignatz to do it, **he, too, is dishonest** because he is contributing to the world's store of dishonesty. He is doing nothing to make the situation better. When the dealer is a mutt and thinks he is getting 25 per cent. discount and mentally calculates that he will allow $800 and afterwards spends $100 to make it run and thereafter gets $500 for it, leaving a loss of $400 which can easily be absorbed by the $700 represented by his 25 per cent., **he is unfit to be in business.**

Expensive Junk

A Universal truck, owned in a large city in Connecticut, was used as a trade-in after the Universal had gone out of production. In the first instance of which I know, it was traded in at $800. Afterward it was sold by that dealer for $350. Two months later it was traded to another dealer for $750, and later sold by him for $300. Within two weeks it was traded back to the dealer who sold it in the last instance at $700 and if my memory serves me correctly, it was sold again, and again traded in. In New York City an old piece of junk was sold by a dealer at $350. Within a very short time it was offered by the purchaser as a trade-in at $600 to the dealer who had sold it to him.

It is one of our burdens that we are doing much business with men who have come up from shop experience and now have entered business. These men, in many instances, know nothing of overhead, depreciation, etc., and do not know that instead of making 25 per cent., they are probably making 6 or 7 per cent. * * *

Piano men burn up old pianos and sell new ones. Printing press manufacturers use a sledge on vital parts and destroy trade-ins. **Just take a look at that single thought.** See what a bunch of semi-intelligent business men we have been. We have been encouraging dishonest and unwise practices in order that we might fail to sell as many trucks as we might sell if we were as intelligent as piano men and printing press men. * * * These men are in an industry older than ours, and you may be certain that their credit departments would not permit their distributors to render themselves unfit to pay bills, and at the same time undermine the industry, making it unfit for decent men. If we had put this subject under a glass—under the microscope of judgment—and given it the cold scrutiny that an insurance actuary gives to his risks, we would have long since discontinued these unwise practices.

Practice Results in Failures

In a recent meeting of motor truck dealers in New York City there were approximately 35 dealers present. A speaker at the meeting asked those to rise who had been in the business in the city of New York continuously for two years or more. Four men rose. Very many less than 50 per cent. of the motor truck dealers in New York City have endured as agents of the same product for two years or more. Failure after failure has characterized the attempt to sell motor trucks in New York City, and practically every failure recorded in the industry is due to the trade-in evil. Now do not assume that the word "practically" is a modification of the fact. In order to hit it harder, let me tell you that fully 99 per cent. of the failures in the motor truck industry in New York City have been due to unwise trades.

It has been the practice of the manufacturers to appoint any kind of a dealer. The idea was to sell trucks. I know of a case in a large city in the east, where the dealer in question sold about 400 motor trucks in a year. No junk too bad for him to take at an excess value. He ran riot for several years and went the way where such practices inevitably lead. If the factory he represented has secured a successor to him, the successor must, in the very nature of things, be of a calibre willing to follow such a situation; and unquestionably the service rendered the ultimate consumers is poorer now than it was under his regime—if such be possible. The ultimate result of this means riotous iniquity and dissatisfied users. Was he to blame? He was not! We are to blame! I say "are" to blame because we continue to encourage such practices. Wholly regardless of our conscientious scruples, it is unwise, unintelligent conduct of the interests in our keeping to continue such practices. * * *

I am here to tell you that our industry needs, not to be honest alone, but it needs to be rigidly honest. Dishonest trade-ins are trickery; a means to the end of cutting prices and are predicated on the belief that old junk can be sold to some unsuspecting victim. In other words, we are gold brick men when we do such things. We are then selling something we **know** to be dishonest. * * *

Yes, I can tell you what all this has to do with eliminating the Trade-in Evil, and I can propose a plan to eliminate it, but the plan isn't worth a whoop unless you men waken up and enforce it. Take it and develop it,—I said "develop," not modify, I do not want it modified—I do not stand for diluted honesty.

This is my proposal: Take any trade at what it is worth. If it has worm parts, or gear parts, or engine parts, or anything else in it sufficiently good to be used in repair jobs on old trucks, take it over and disassemble it. Put the parts into sacks, and label them. Fix the value of good second hand parts in a parts catalog to which we can all agree. Tell Mr. Retailer that in the second hand parts catalog will be found the value of second hand trucks, and if the old junk contains $300 in usable parts, that amount is what we will give for it. Then call up the original seller of that truck, or communicate with the factory that made it, and demand, and get, $300 for those good and usable repair parts. At that time the original seller may say that he has $400 of the other dealer's parts and ask for a check for the difference. Thereupon the Clearing House is at work.

Business or Junk?

Consider this gentlemen — by such means an old truck has now gone out of existence, and inevitably it must be replaced by a new one. What is your business, junk or chassis? Now don't laugh, —I didn't mean anything personal by that. Seriously, perhaps every truck is as good as its time and as good as its price.

Now you want to know how we are going to enforce this. By "gentlemen's agreement?" Gentlemen, the years have cavorted over the top of my head and worn it shiny. By processes of induction, if not by processes of intelligence, I have gathered some things which I am pleased to call knowledge. Listed under the numeral "One," is the knowledge that "gentlemen's agreements" are idle. The day is coming when they may be useful, but I don't believe it is here now.

I propose the enforcement of this plan —and I use the word "enforcement" because I mean enforcement—through our several Credit Departments. I suggest that our Credit Departments write to our various dealers and distributors and offer them some fatherly care—you know how father's "offer" their care? Frankly tell them that very many men miscalculate their profits, that they think the profits more than they can be after expenses of every nature have been paid. Offer them a series of simple lessons on credit, on safe procedure and various other fundamentals necessary to successful business and em-

* Paper read before the National Motor Truck Sales Managers' Convention in Detroit, by J. W. Allen, Eastern Branch Manager of the Service Motor Truck Co.

body it all in a series of simple-language essays on these several topics. At the same time advise them that a new contract form has been adopted and a new clause is now arbitrarily read into all contracts: Have it read something like this: (Assuming that the first party is designated as the "Manufacturer," and the second party is designated as "Distributor"):

"The Manufacturer does by this instrument, agree that he will keep the Distributor fully informed on the market prices of second hand motor truck parts as evidenced by a second hand parts catalog issued by the Manufacturer, and subsequent supplements, and the Manufacturer will require that values of all trades of old trucks shall be calculated as usable parts. The Manufacturer agrees that if the nearest distributor of (the named truck) cannot at the time use such returned parts, that the Manufacturer will find a market for such at the valuations officially established.

It is recognized by both parties hereto that the basic principle of good business is to buy at value and sell at value, and the Distributor does, by this contract, bind himself to purchase second hand trucks at actual value. As an evidence of continued safe and honest policy in this regard, he does by this instrument, bind himself to furnish a monthly financial statement of his business affairs in the interest of continued safe conduct of the Manufacturer's sales and in his own behalf."

You may say this is crude and I may agree. But I have evolved a feasible plan, made up of basic, sound principles which are being applied in other lines of endeavor. There is no occasion to mince words. I propose to enforce safe and honest business methods upon dealers by having the iron hand of the Credit Departments upon their collars **all of the** time.

We should take these principles and develop them for the sake of our trade. We can do this if we want to, and if we don't want to, we should stand up like men and say we don't want to. Whereupon some of us will quit the industry. Those of us who cannot be bright have recourse to simplicity, and nothing is more simple than honesty and nothing is more dishonest than to encourage lame mentalities into practices that weigh against the business fabric as well as the moral fabric of our nation. No man has a semblance of a right to do such things, and we, as high-thinking men, looking down upon the mental processes of the clod, are in duty bound to take every possible step toward cleaning house in the motor truck industry. There is nothing more rotten, sore, putrid, with bad morals, than this trade-in practice. He, who says it is business, confesses his lack of knowledge of the term. It is no more business than booze is business. It is inherently, basically, characteristically, dishonest. The opposite of dishonesty, is honesty—the opposite of dishonest trade-ins is at least, trade-ins at honest value. * * *

Pneumatic Equipped Trucks Carry Sugar Beet Crop of Western States

MOTOR trucks this year are doing their bit to alleviate the sugar shortage. Out in Western Nebraska and Colorado, where the sugar beet crop will be turned into more than 200,000 tons of small sweet crystals, a large part of the hauling from field to mill is being done by the motor truck.

During a recent trip through this territory, J. E. Baird, advertising manager of the General Motors Truck Company, saw the motor truck fleets in operation and brought back a story of what they are doing.

All thoughts of sugar fail to include Nebraska and Colorado as sugar producing states, yet these two commonwealths boast of sugar beet fields that this year have harvested 1,500,000 tons of the tubers. Sugar beet raising has been a rapidly growing business in this territory for the last several years and has been a big help in furnishing the country's sugar supply.

Beets this year are bringing the farmer in the Colorado-Nebraska section $10 a ton and the average crop is 12 tons to the acre. Of this $120, half of it is needed to plant, cultivate and harvest the crop, leaving the farmer a clear profit of 100 per cent.

Most of the harvest work is done by Russians and Japanese and the wages paid them average about $25 to the acre. The beet sections are full of this foreign help during the harvest season for the beets, after being dug with a horse-drawn machine, have to be topped and piled up by hand.

Scattered all through the beet sugar country are mills for refining the product. A layout of these plants makes it possible to cover the hauls from field to mill in an average distance of less than 50 miles. And while a lot of horse-drawn equipment is being used, motor trucks are rapidly supplanting this. Even in the case of outlying stations, where special railroad spurs have been run into the beet country, the farmers are employing trucks to get their beets from field to siding.

Although a number of these western farmers own their own trucks, there is quite a large business being developed in the country by independent motor truck owners who make a specialty of hauling for the farmers. Rates for this work vary, according to the distance and tonnage, but the truckers say they are able to make a nice lot of money during the harvest season and at the same time transport the beets at a fair price to the farmer.

Right now the Nebraska prairies remind one of the old days when cavalcades moved westward to settle the country. As far as the eye can reach, one can see clouds of dust from teams and trucks that are wending their way from the beet fields with their loads to the sugar stations and factories. This sight is to be seen for a month every fall and for 150 days the sugar mills are in full blast. This is sufficient to refine the crop in this locality.

Only 14 per cent. of a Nebraska sugar beet is really sugar. The average sized factory in the district can consume about 1250 tons of beets a day which produces about 185 tons of refined sugar. The refuse from this process is made into a cattle feed that the mills sell back again to the farmers.

An added bit of revenue to the beet raising farmer is the sale of the tops which are left in the field. These are sold to cattle feeders who either drive the cattle on to the fields to gather them up, or rake them up and haul them to the feeding pens. These tops bring from $10 to $15 per acre.

Pneumatic Equipped GMC Truck Gathering Sugar Beet Crop

Increasing Business by Eliminating Express Shipments

THAT'S Service—me for Goodyear."

That expression made by a New Philadelphia, O., tire dealer gives concisely the opinion of all Goodyear dealers as to the merits of the Goodyear Highway Transport Trucks.

Unsatisfactory express shipping needs no comment, the Goodyear Branches have had their share and to say the least, the delays experienced in the delivery of tires by this method, has been extremely discouraging to the branches and to the dealers and repair station owners in the various territories.

But to get back to the beginning. The Goodyear Branches had always delivered orders of tires via express at the customer's expense, and many do yet. After shipment came the wait and later when delivered, the express charges to pay. And perhaps, in the meantime, a number of customers lost on account of lack of stock.

Delivery Service Proposed

To eliminate these conditions, the Goodyear Co. purchased a motor truck for the use of the retail sales branch at Akron. Its success has caused the purchase of other trucks at many branches, including Joplin, Mo., Chicago and Philadelphia.

The Akron truck is a Federal 1½ ton, equipped with Goodyear cords and a special covered express body with steel wire sides, which makes an excellent appearance and creates considerable comment and attention in all towns through which it passes.

Although the system is just getting under way, the customers are highly elated with the service, which is given free, and are prompt in sending in orders in time for the weekly delivery.

Every city and town in the various Branch territories, taking Akron as an example, receives deliveries at least once a week. Some receive additional delivery, Canton and Massillon, for instance; as these towns happen to be on two different routes. A different route is made regularly every day, except Saturday, thus the customers know that if their orders are in two days before the scheduled trip to their town, they will get their goods on that trip.

This time is necessary to put the orders through the proper channels and have the tires checked out by the shipping clerk.

The writer visited the Akron Branch on a Thursday, the day for delivery to New Philadelphia and many other towns enroute. All orders from this territory received on Tuesday of that week were ready and the truck was loaded with tires, inner tubes, belts, repair outfits, rubber packing, etc., a fairly good load as to quantity, but not a capacity load as to weight. It left the loading platform of the Goodyear plant at 7 A. M., reaching Canton, 21 miles over fairly good brick roads, by 8 o'clock.

Here two deliveries of nine packages, including bundles of tires tied together, were made and by 9 o'clock the truck was in Massillon, another 8 miles. Three deliveries were made in Massillon, consisting of eight packages.

Then on over dirt and brick roads, through Navarre, Justus, Beech City and Strasburg, no deliveries being made on this trip at these small places. Dover was reached at 11.40, where two deliveries of twenty-four packages were made and then across the river to New Philadelphia, making this place at 12.15. Forty minutes were required for lunch, after which two deliveries of ten packages were made and the truck left New Philadelphia on the return trip at 1.50 P. M.

The odometer showed 62 miles for the one way trip, which was made in 6 hours 50 minutes, including all stops. In order to show the writer the various other towns that could be made on this trip, the return was made over dirt roads through Zoar, Sandyville and New Sparta, into Canton. This route proved shorter, although grades and road conditions would make the route very difficult during wet weather.

The return trip was 48.6 miles and the Goodyear garage at Akron was reached at 5.35. The truck had made 110.6 miles, total time, 10 hours, 35 minutes, including all stops. Twelve gallons of gasoline were consumed, making an average of 9 miles per gallon. This gas mileage is no doubt made possible by the pneumatic tires, as the 1½-ton truck would hardly average more than 6 miles at the most. The road is up and down grade, but in very good condition.

While in New Philadelphia we met the salesman in charge of this territory. He stated that this motor truck delivery had increased his business considerably and would add even greater impetus to his sales in the near future.

The truck went into service the first of May. The following results show what this truck is accomplishing:

	May	June	July (to 17th)
Days operated	22	22	14
Round trips	24	22	14
Deliveries	71	135	114
Packages delivered	44641	48035	32405
Packages picked up	7913	4340	4380
Total handled	52554	52375	36785
Miles traveled	1974	1947	1080
Gallons of Gas	211	224	100
Pints of Cylinder Oil	56	86	46
Miles averaged daily	90	88.5	77
Miles per gallon of gas	9.3	8.7	10.8
Miles per gallon of oil	282	181	170
Cost per month (all items)	$486.42	$487.08	
Cost per day	22.11	22.14	
Cost per pkg. delivered (not including pickups)	.01	.01	

The package rate is extremely low, and this package may be a bundle of five or six tires. While but 14 days of July are given, yet the deliveries and packages handled are almost as great as the preceding month. On the basis of $22 a day, the July cost to the 17th would be $308, which gives a rate of .009 cents per package.

The expense of delivery is paid by the Goodyear Co., but the increase in business secured by the service more than offsets the small cost per package delivered.

It can easily be seen how great a factor in the building of big business this quick-delivery-service-at-no-cost-to-customer really is. With reasonably good roads motor truck "Highway Transport" service can be extended to all towns within sixty miles or more, from any big industrial center and eliminates all delays and expense incurred by railroad express shipments. And when these deliveries can be made for one cent each by securing proper volume, the outlook for such business in the future seems very bright indeed.

The Goodyear Store-Door Delivery of Tires and Tubes From Akron

Delivering twenty packages consisting of tires (each package from two to six tires) inner tubes, etc., to a tire repair station at Dover

Firestone Engineering & America's Truck Tonnage

Providing the right truck tire for every road and load has been a Firestone responsibility since the first truck tire was built.

Good roads have been slow to come—but trucking has gone forward regardless.

Firestone, keeping pace with the trucking industry, has solved problem after problem, until trucks are hauling the great bulk of America's tonnage and are strong allies of the railroads in inter-city traffic.

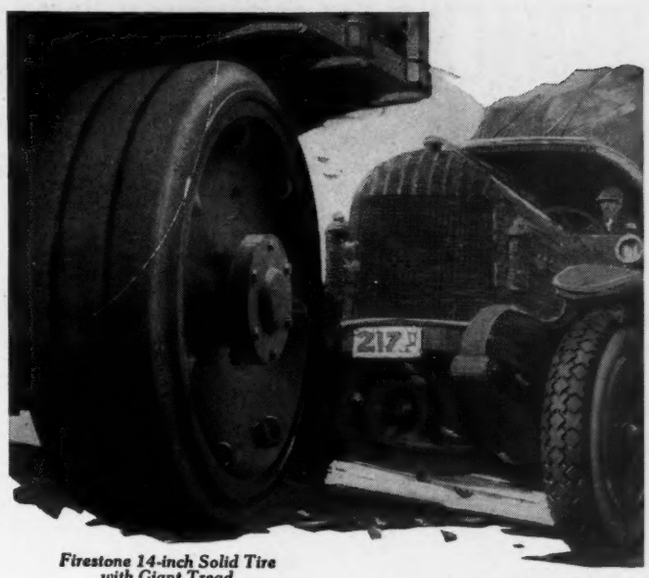
Firestone engineers designed the first truck tire, and from that day to this the history of truck tire progress is Firestone history.

As the truck builders advanced they found Firestone ready, not only with the right tire but the right rim.

Firestone introduced the channel type of tire, the removable type, the cup cushion type, the giant type, the grooved tread type.

Firestone was first to build a complete line of truck tires—a type suited to every road, load and condition of service.

Firestone was first to establish adequate service dealers everywhere; 750 now serving every trucking center in America.



Firestone 14-inch Solid Tire with Giant Tread

Firestone Giant Cord—Extra Heavy Non-Skid Tread

Firestone was first with a practical, efficient giant cord tire equipment, including demountable rims.

And Firestone was the first to manufacture the tire and the rim complete.

Firestone engineers were ready, too, for the problem of quick changes for the giant pneumatic tire.

Here they went beyond the tire and rim and designed a feature of wheel construction for truck makers, also a spare tire carrier device that makes one man able to change tires easily regardless of weight.

The Sign of Good Trucking Service: Manufacture—Operation—Maintenance

These examples of Firestone Engineering explain the success of the "Ship by Truck" movement.

And Firestone Ship by Truck Bureaus in all trucking centers are giving daily aid to truck operators of all classes.

Today over half the truck tonnage of America is carried on Firestone Tires. This is the reward of sound engineering; tires, tubes and rims of commercial perfection; service that is intelligent, adequate and on the spot.

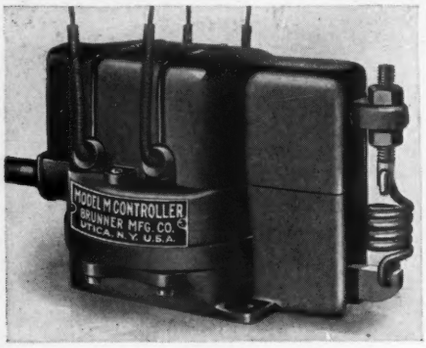
Firestone

Most Miles per Dollar

TRUCK EQUIPMENT AND APPLIANCES

The Automatic Air Pressure Controller

A controller that will maintain a predetermined tank pressure up to a limit of 200 lb. is being marketed by the Brunner Mfg. Co., of Utica, N. Y., a company known for its production of controllers of all types. This latest and most popular type is known as the "M" Model.



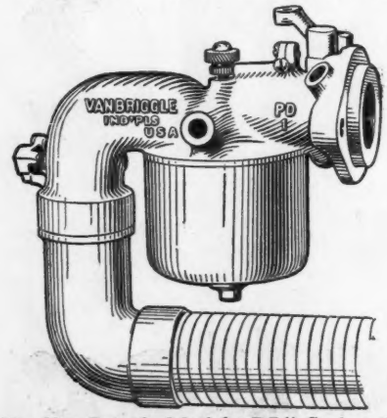
The New Model M Air Pressure Controller

The controllers are made in three models, according to the electrical specifications. The Model "M" is suited to D. C. motors up to ½ hp., or A. C. motors up to 3 hp., with a volt limit of 440. The model "L" is especially adapted to A. C. motors above 3 hp. and voltage not over 440. The Model "E" consists of the Model "M" controller in connection with a solenoid two-step starter, and is adapted to D. C. motors above ½ hp. These controllers are connected to the storage tank, and the power circuit is wired through the controller to the motor.

Van Briggle "P" Line of Carburetors

The "P" line of carburetors, made by the Van Briggle Motor Device Co., of Indianapolis, Ind., is featured because of the fact that it has no venturi tube, weights or by-passes, is made without auxiliary air valves, and has but one adjustment.

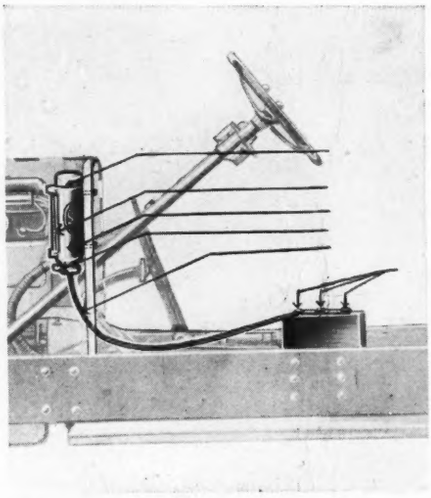
Simplicity is the keynote throughout the design. The airplane principle of carburetion is incorporated in the carburetor. As the velocity of the air which passes through the carburetor increases, it is said that the amount of gasoline leaving the spraying nozzle automatically decreases, thus making a positive reduction in the amount of gasoline consumed. The various models are applicable to many makes of engines. The prices range from $10 to $15 each.



The Van Briggle Model "PD" Carburetor

Automatic Battery Water Filler

The Forrest Co., Inc., 1974 Broadway, New York City, is marketing the 20th Century Automatic Battery Water Filler, which is a device to attach to a car equipped with a storage battery. Its purpose is to supply the required quantity of water to the battery whenever it is needed. This device will maintain a constant fluid level, thus cutting down any possible expense of repair on the battery due to lack of water, and it also saves time and stops at a battery service station, or in refilling the battery.



Phantom View, Showing How the Automatic Battery Water Filler is Connected to the Battery

This outfit consists of an aluminum water container of about one pint capacity, screwed to the dash board under the hood. A gauge at the side of the container shows the water level at all times. The water flows to the battery through a flexible metal covered rubber tube to special hard rubber filler caps containing float valve, which substitute original caps of the battery. As the level of the electrolyte goes down the valve opens and allows just enough water to drop in to bring the electrolyte to the proper level, whereupon the valve closes. A pet cock just below the container allows the water to be shut off at that point if desired.

"Easyroll" Traction Chains

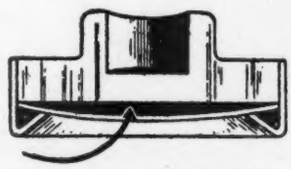
The "Easyroll" Anti-Skid Clip is a device for solid tires which is attached in units so that the chains run diagonally across the tread. It is also obvious that by placing the anti-skid chain diagonally across the tread of the tire, the wheel would roll on to the chain with far less shock than if placed straight across the tread.

The "Easyroll" Anti-Skid Clip

These chains are quickly detachable, the clamps being permanently attached to the wheel. Another feature is that because the chains are placed diagonally, the application of the chain can be reversed so that wear can be distributed over a greater area of the tire. The clips are forged from 20 point carbon steel. Clips can be had for either oval or square spokes, and are retained to the spokes by U-bolts and nuts. This device is manufactured by the Will-Burt Co., Orville, O., and the prices range from $1 to $1.50 each.

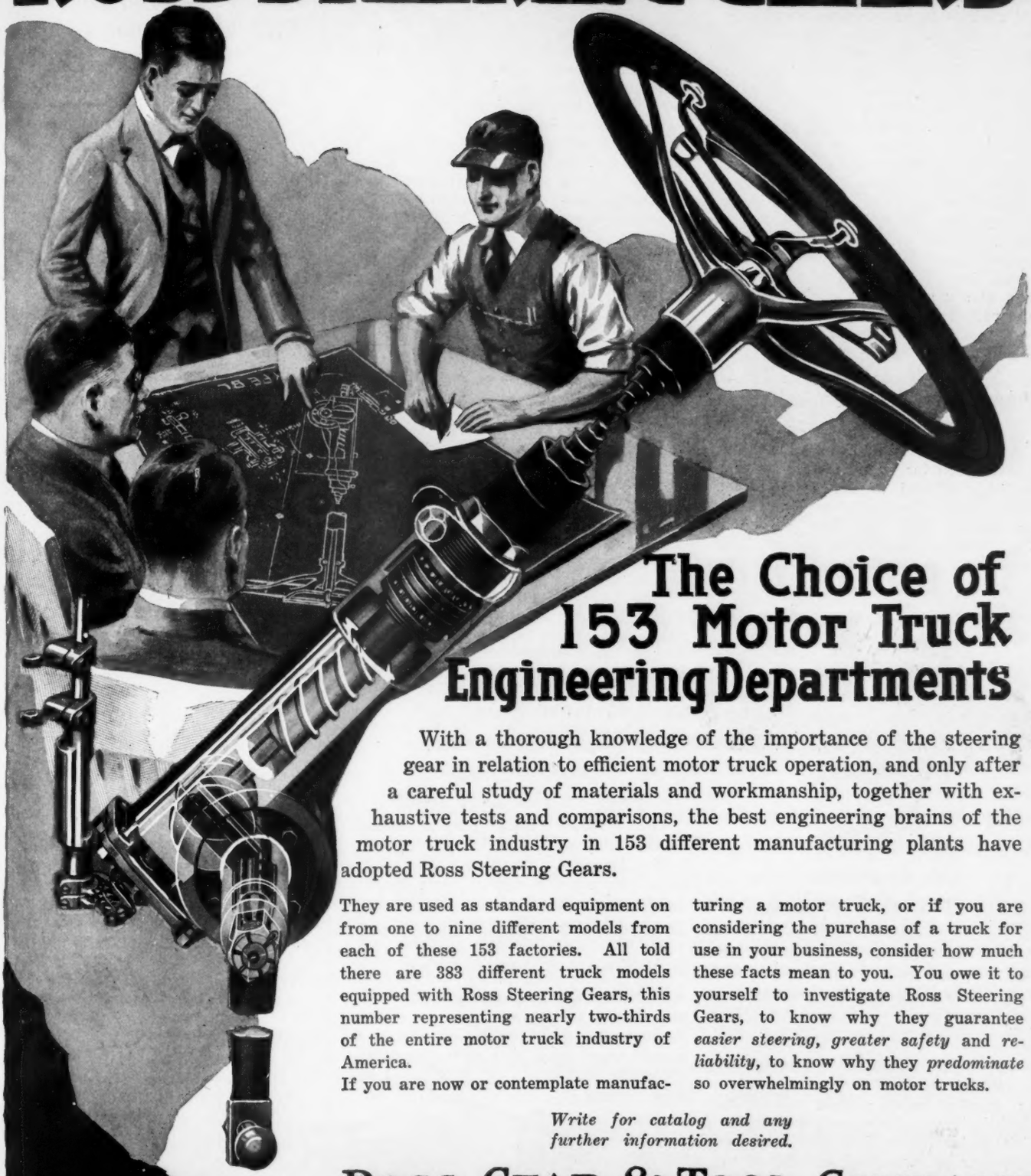
Overhead Valve Tappet Silencer

The Soenksen-Spiers Engineering Co., 67 S. Broadway, Aurora, Ill., is manufacturing a device designed to silence the taps on the overhead valves on an



Overhead Valve Tappet Silencer
Attention is called to the noise-absorbing oil compartment

ROSS STEERING GEARS



The Choice of 153 Motor Truck Engineering Departments

With a thorough knowledge of the importance of the steering gear in relation to efficient motor truck operation, and only after a careful study of materials and workmanship, together with exhaustive tests and comparisons, the best engineering brains of the motor truck industry in 153 different manufacturing plants have adopted Ross Steering Gears.

They are used as standard equipment on from one to nine different models from each of these 153 factories. All told there are 383 different truck models equipped with Ross Steering Gears, this number representing nearly two-thirds of the entire motor truck industry of America.

If you are now or contemplate manufacturing a motor truck, or if you are considering the purchase of a truck for use in your business, consider how much these facts mean to you. You owe it to yourself to investigate Ross Steering Gears, to know why they guarantee *easier steering, greater safety* and *reliability*, to know why they *predominate* so overwhelmingly on motor trucks.

Write for catalog and any further information desired.

ROSS GEAR & TOOL COMPANY
760 Heath Street, Lafayette, Indiana, U.S.A.

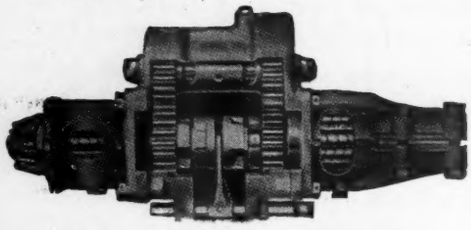
The Steering Gears that Predominate on Motor Trucks

engine. The maker states this device, the Oil Cushion Tappet, can be attached with the parts in close contact with each other, right from the cam, through the cam lever to the rocker arm. The rocker arm itself rests tightly on the top of the oil cushion tappet, but the flexibility of the spring, in the top of the oil cushion tappet, is stated to take care of the expansion after the engine has heated up.

This device consists of a solid case-hardened base, with a hole of the proper size to fit on the top of the valve stem. On the top of this base is a vanadium steel spring, dish shaped, held in place on the base by the cap, in the rim of which is an oil wick. After the tappets are attached, the caps are filled with oil. At every blow of the rocker arm the oil cushion tappet pushes down on a cushion of oil, deadening the sound of the blow. The maker states this device will give unusually quiet action and makes it easy to adjust valves. The retail price for a set of 12 is $5.

Four-Speed Transmission for Ford One-Ton Truck

A new four speed forward auxiliary transmission for the Ford one-ton truck is being offered to the trade by the Victor-Ford Transmission Manufacturers, 250 W. 54th St., New York City. The standard underdrive model "TU" can be attached immediately to the Ford 100-in. wheelbase Model T chassis. It includes a shortened drive shaft and lists



Victor Four-Speed Forward Auxiliary Transmission
This can be obtained in over or under-drive models

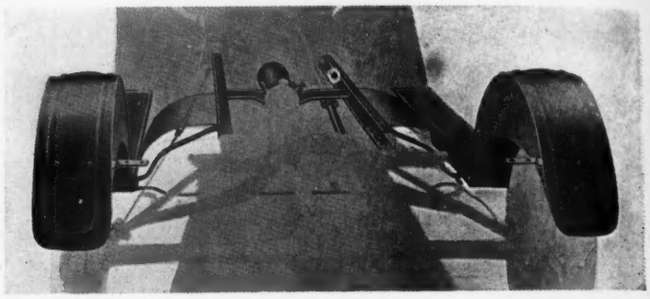
at $85. The overdrive model, to increase the speed of the car, sells at the same figure. Model WU underdrive for the Ford one-ton worm drive truck, sells at $120, as does the overdrive for the same chassis. Another model, the GU, is an underdrive for the internal gear driven or exposed drive shaft, converted Ford truck or tractor. The price is $135. Other special models are being made to fit the short wheelbase tractor or the lengthened truck. These transmissions are supplied with a foot accelerator which facilitates the operation of the car.

The underdrive models double the pulling power of each Ford and the 20 per cent. or 40 per cent. overdrive increases the speed of the Ford. A feature of the Ford when equipped with a transmission of this type is that a positive neutral point is provided, which entirely eliminates any possible drag on the Ford high-gear clutch when cranking the engine. This is a feature which will be appreciated in cold weather.

Hoover Extension for Ford Chassis

The Hoover Wagon Co., York, Pa., is producing an extension for lengthening the Ford wheelbase 18, 24 or 30 in. with the following prices: $33.60, $34.80 and $36, respectively.

This frame is joined to the original frame by means of long splicing channels and splicing plates with heated rivets. The adjustable cross member carrying brackets used to support the tube of the extension, has set screws and lock nuts so that the extension shaft and tube can be kept in perfect alignment with the transmission shaft. The extension is furnished complete down to bolts, nuts, rivets, washers and set screws necessary for making the assembly.

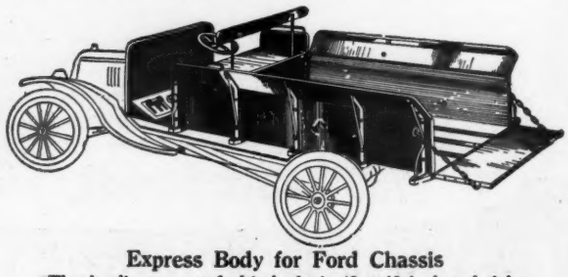


Phantom View of the Hoover Extension Frame and Mud Guards. Provision Has Been Made for Extended Runningboards and Splash-Pans

In addition to this extension, the maker provides all the necessary parts required for equipping the chassis after the extension has been made, such as full length running boards and splash pan extensions. The prices for these sets are $12, $13.20 and $14.40, respectively. The extension shaft is machined from single piece Hy-ten steel which is warranted against breakage. The running boards are covered with linoleum and bound with aluminum molding and the splashers are drilled, ready for attaching.

Express Body for Ford

The Express Body Corp., Crystal Lake, Ill., manufacturer of express bodies for Ford cars, has recently offered a new popular express body to the Ford trade. It is known as Model No. 15 and was especially designed for the Ford Model T chassis. The loading space of this body is 43 x 63 in. and height 15 in. overall. Hardwood is used throughout the construction of these bodies and the corners are reinforced with iron braces. The flare and bottom boards are stripped with wear plates and the chain end gate can be adjusted to any load. The body is painted black and furnished with foot boards and full length lazy back. The list price is $53. The total length of the body is 102 in.; total width 42 in.

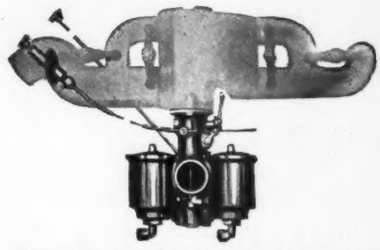


Express Body for Ford Chassis
The loading space of this body is 43 x 63 inches, height fifteen inches over all

Dual Fuel Carburetor for Ford Cars

A new carburetor designed to accommodate kerosene after starting on gasoline is being produced by the Western Carburetor Co., Inc., Alma, Mich. This product varies from that of the standard carburetor in that it has two bowls, one for each fuel. Fuel is shut off from one bowl or the other by manipulating a lever provided for this purpose. The passage of low speed air is also controlled by the lever. The latter feature, the maker states, gives perfect low speed adjustment for either fuel.

The double venturi feature is a patented construction, the adjustment of which



The Western Dual Fuel Carburetor

is operated manually, although if once set for either fuel it operates automatically.

With this carburetor is furnished special manifolds to fit the various types of engines. The manifolds are made of cast iron and have a number of heating tubes in the inside, made of seamless cold drawn steel tubing. The carburetor is of brass with the exception of such die cast parts as are necessary. The price of the carburetor for use on the Ford car is $35, f.o.b. Alma, Mich.

The construction and operation of these carburetors is simple. The kerosene is drawn from the fuel nozzle by the suction of the engine. The flow of air with which it is constantly surrounded is regulated by a venturi tube, giving the highest velocity at the nozzle point. An auxiliary venturi tube surrounds the first tube, which is adjustable and acts as a gate

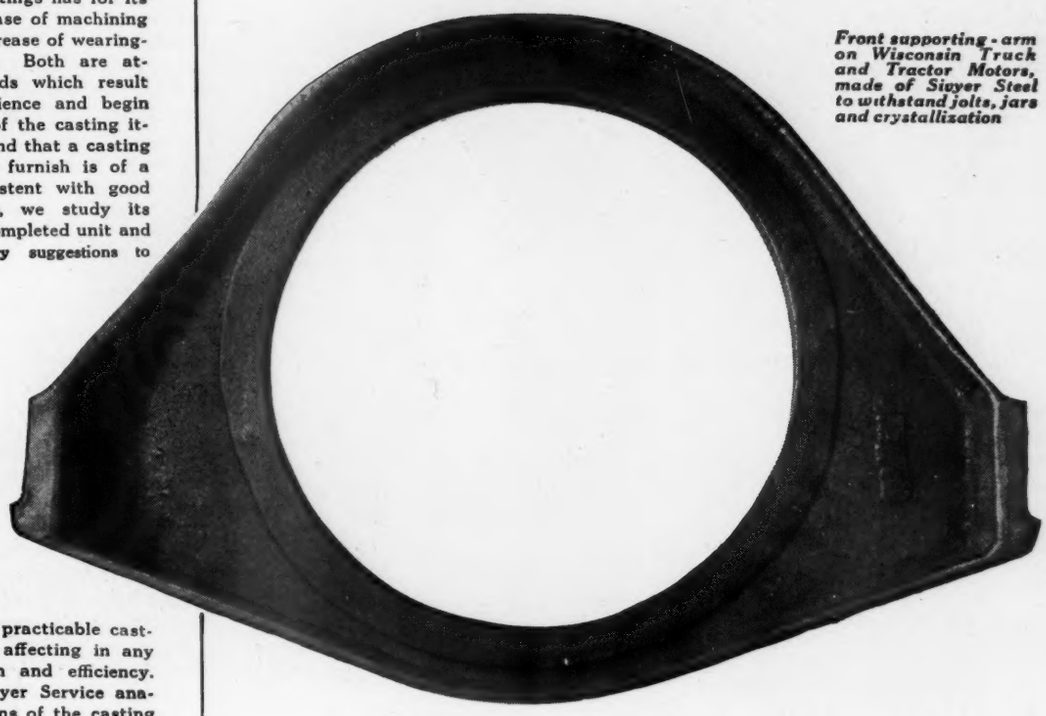
SIVYER S CASTINGS

The Sivyer Service of providing Electric Steel Castings has for its objects the decrease of machining costs and the increase of wearing-quality and life. Both are attained by methods which result from long experience and begin with the design of the casting itself. When we find that a casting we are asked to furnish is of a design not consistent with good foundry practice, we study its function in the completed unit and offer the necessary suggestions to make it a really practicable casting job without affecting in any way its function and efficiency.

Secondly: Sivyer Service analyzes the functions of the casting and specifies the proper composition steel for the job; long experience with carbon and alloy steels has enabled us to reduce costs and increase quality remarkably for many different industries.

Thirdly: Sivyer Service makes a careful study of the pattern and molding problems involved, for improper gating and insufficient risers are often the greatest wasters of machining labor and metal.

Fourthly: Sivyer Service analyzes carefully the proper annealing methods to be used and controls their proper application through unfailingly efficient equipment and men. In short, the Sivyer Service supervises every step necessary to secure unusually and unfailingly good castings of electric steel. It never relies on one factor alone, relies very little even on the natural freedom of electric steel from occluded gases and on its commonly recognized merit in resisting crystallization. It also depends but little on the inherent scientific accuracy of the electric furnace process. From casting-design to sand-blasting and tumbling, the fundamental superiority of Sivyer Steel is due to its men and metal. Their value is best proved by the fact that, although the production of steel castings is generally looked upon as a local one, the Sivyer market is national.



Front supporting-arm on Wisconsin Truck and Tractor Motors, made of Sivyer Steel to withstand jolts, jars and crystallization

THE care taken by truck manufacturers to make every part absolutely sound and strong, no longer stops with vital things like the motor. It extends even to the small castings that hold the motor and other parts in place. Because of its ability to withstand the shocks and strains of severe truck work and its great resistance to wear, more and more truck makers are using castings of Sivyer Electric Steel. For ordinary metal gets tired and breaks—engineers say it crystallizes—under the constant jars of haulage service. But Sivyer Electric Steel is fatigue-proof. It stands many years of the roughest service without cracking or breaking. Thus the progressive truck manufacturers using it assure utmost value to the purchasers of their product.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

or valve to regulate the flow of air, and which also can be controlled at the dash board. The maker states the air surrounds the mixture like a jacket and prevents direct contact with the walls of the carburetor. The auxiliary air is completely mixed with the inner and richer mixture upon reaching and passing through the venturi passage in the manifold. The maker states the fuel is here heated by the exhaust gases and converted into a highly explosive gas.

Radiator for Ford Truck

One of the new radiators being manufactured by the Motor Truck Radiator & Mfg. Co., 1789 Broadway, New York City, at the present time is the Emco. It was designed exclusively for the Ford one-ton worm drive truck.

It is stated to give the cooling system sufficient capacity to meet the requirements of truck service and to keep the water of the cooling system from boiling. It is unusually strong, the

Special Radiator to Meet Requirements of One-Ton Ford Truck Service

tanks and frame being made of tough, malleable castings; the radiator being made of 76 individual tubes, ⅜ in., of seamless drawn copper with a heavy side wall. The top and bottom tanks are detachable if repairs should be necessary and any tube can be removed and a new one put in place. The Emco radiator sells for $50.

Three Linings in Unit

A new idea in Ford transmission and brake linings is embodied in the L & L One-Piece, Slip-On Lining recently placed on the market by the L. & L. Automobile Accessories Corp., Hartford, Conn.

Instead of adhering to the three-piece principle, in which a separate piece for each band is used, the L & L is made in one piece.

The L & L One-Piece can be adjusted in less than one hour. The succeeding ones require only about a half hour's time to attach, which is a saving in time and labor.

Another feature is that no rivets nor felt gaskets are necessary when installing it. In fact it is unnecessary to re-

The L & L One-Piece Lining

move the transmission cover to put one in after the first one has been attached.

L & L linings are claimed to do away with chatter and vibration. It retails at $3.

New Farm Lighting Plant Operates on Kerosene

An electric light and power plant for farm use is being produced by the Litscher-Lite Corp., Grand Rapids, Mich. It is operated by an engine rated at 4 hp. and which has a 1 kw. dynamo. It has a 3-in. bore and a 4½-in. stroke and it is designed to operate at a speed of 1150 r.p.m. It is the 4-cycle type.

The cylinder head is removable to permit access for cleaning out carbon. The valves are 1¾ in. with large port openings. The engine is held to the base by four bolts, the unscrewing of which enables its removal.

The crankshaft is a 1¾-in. drop forging. The camshaft is a drop forging with ground bearings. The main bearings are die cast of Ulca metal and are 3 in. long. The gears which are accessible are steel on bronze. The flywheel has the fan blades cast into it and is entirely enclosed.

A Modine Spirex radiator provides cooling. It has a copper core. Water circulation is by thermo-syphon system. The capacity is 1½ gal.

A 1-kw. dynamo, which is of the Dyneto make, cranks the engine for starting. It has a drawn steel frame and is shunt wound with ball bearing equipment.

A Wells 32-volt coil which is mounted on the radiator, furnishes ignition for the engine. A distributor is mounted on the extended camshaft.

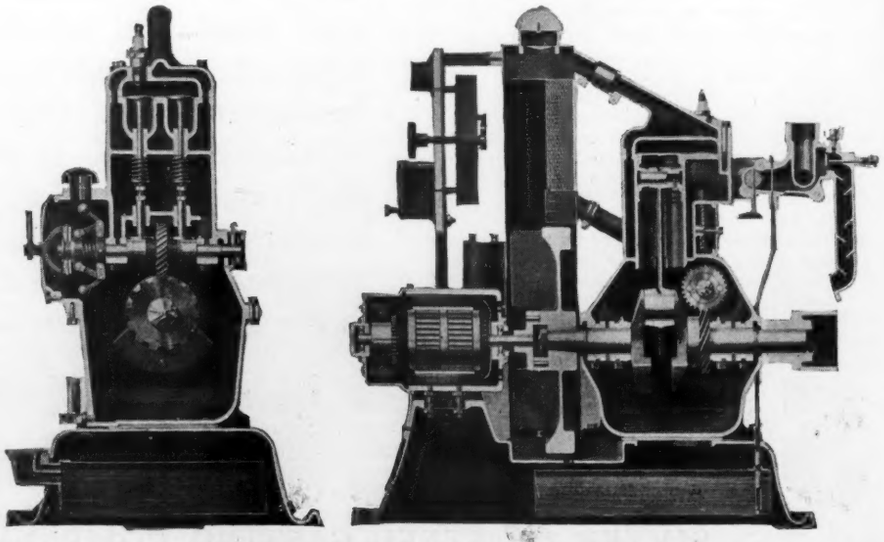
The switchboard contains a voltmeter, ammeter, rheostat, main switch and Hartman automatic cutout. The Hartman cutout consists of starting and stop buttons and reverse current circuit breaker. Should the engine stop it is designed to prevent the batteries from discharging through the dynamo and to disconnect the ignition circuit and insure the coil against being burned out.

Four sizes of storage battery of International make are offered for choice. These include 130, 210, 280 and 330 ampere-hour sizes. There are 16 cells giving 32 volts.

A floor space of 19 x 32 in. is required to mount the outfit. Without batteries the shipping weight is 450 lb.

A feature of the engine operation is the conduction of heated air through a sleeve encircling the carburetor air intake so as to heat the mixture before it enters the combustion chambers.

Universal Service Battery Co., the name adopted by James B. Schafer, Chicago, Ill., a dealer in automobile storage batteries, is so similar to "Universal Battery Co.," a previously established Illinois corporation, that the Federal Trade Commission has ordered Shafer to discontinue the use of the word "Universal" in connection with the manufacture or sale of storage batteries.



Sectional Views of the Litscher-Lite Farm Lighting Plant

Hundreds of dealers will recognize this Atterbury

Thousands of Truck Prospects saw it perform

10 years of truck making experience behind each ATTERBURY

THIS is the 2½ ton Atterbury that made such a wonderful record in the National Motor Truck Development Tour.

5229 miles—"Buffalo to Buffalo"—without opening the tool-kit!

5229 miles of roads—good and bad—(mostly bad, the driver says) without loosening a nut!

Many of you dealers in Indiana, Illinois, Iowa, New York, Pennsylvania, Ohio, South Dakota, North Dakota, Minnesota and Wisconsin will recognize this Atterbury, and can vouch for the fact that it was "going strong" when it passed through your town.

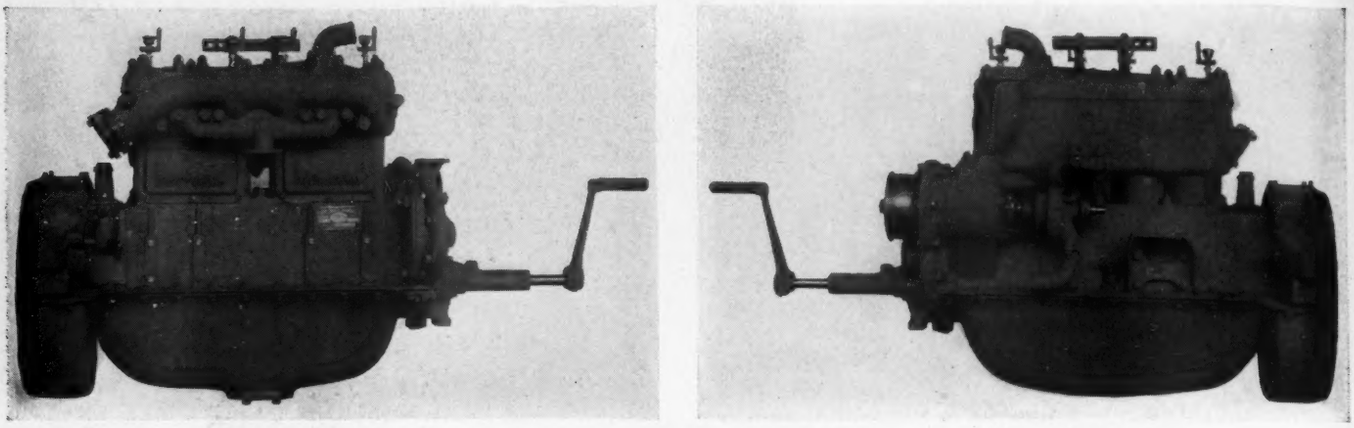
Ask us for our new folder telling about the trip.

ATTERBURY MOTOR CAR COMPANY, BUFFALO, N. Y.

ATTERBURY

MOTOR TRUCKS OF MAXIMUM SERVICE

Buda Announces a Remodeled Line



Right and Left Sides of the Buda Engine
Note flexible hose connections and intake and exhaust manifolds that are cast integral

THE new Buda engines, which are of heavy-duty design and made in eight different sizes, are larger and built for greater accessibility than were the former models. The external appearance and essential parts of the various models are similar, differing only in that the sizes of the units necessarily vary. The smallest engine has a 3½ in. bore and 5¼ in. stroke. The large capacity engine has a 5 in. bore and 6½ in. stroke.

The cylinders are cast of gray iron in block. There is ample provision for cooling through large water spaces around the cylinder heads. The cylinder heads are removable. The pistons are gray iron, and each has three rings above the wrist pin.

In order to still further prevent the passage of excess oil above the piston a wiper ring has been provided in the skirt of the piston. Ribs in the inside of the piston are said to facilitate cooling by dissipating the heat. The connecting rods are drop-forged I-beam section and are of chrome vanadium steel. The piston pin bushings are phosphor bronze. Babbitt-lined bearings are used in the lower end of the connecting rod. The piston pins are steel. They are secured by two locks; one is a lock screw which has two sets of threads of different diameters and extends through the boss and wrist pin; the other is a spring retainer pin that expands in grooves turned in each end of the piston bosses. Three main bearings carry the drop-forged crankshaft. It is carefully balanced and is drilled for force feed oiling. The rear end of the shaft has two oil throwers that prevent passage of oil beyond that point. This end is also provided with a flange to which the gray iron flywheel is bolted by six bolts. The crankcase consists of two parts. The upper half of the crankcase contains the crankshaft bearings and extends over the flywheel forming the upper half of the bell housing. The lower half of this housing is a separate casting and not a portion of the crankcase or oil pan. The oil pan is divided into sections, the lower compartment forming a large oil reservoir. Directly beneath the oil pump is a large hand hole through which the pump screen may be easily removed for inspection or cleaning. This is another feature of accessibility embodied in this new line of engines. The bottom of the oil pan forms the sump.

The drop forged camshaft is carried in three bearings of liberal dimensions. The timing gear is bolted to a flange at one end of the shaft. The timing gears have a wide face and are helical cut.

The entire valve mechanism, operated from this single camshaft is completely inclosed. The cover is split into two sections to facilitate removal for repairs. The valves, the larger sizes of which are made of high tungsten steel, are equipped with the barrel type, self-centering valve springs which are claimed to eliminate side thrust on the valve stems. Unusually large mushroom valve push rods of special steel fitted with readily removed guides are used.

A combination breather and oil filler prevents admission of any dust to crankcase.

Water is circulated by a centrifugal pump. Liberal sized packing glands are provided and bronze sleeves are fitted over the pump shaft to prevent rusting and pitting, thus assuring long life to the pump packing. Made up as one unit, the water pump and its drive shaft may be readily removed as a unit or separately. The water outlet on the cylinder head is fitted with a removable elbow which may be placed in four different positions.

A full force pressure system lubricates the crank and camshaft bearings through a drilled crankshaft. This system is of the self-contained positive pressure feed with a pressure regulating valve. The oil is pumped from the oil reservoir which is located beneath the crankcase, by a geared pump in the center of the oil reservoir and attached to the upper half of the case to make it independent of the oil pan. The oil is forced to the crankshaft and connecting rod bearings through a seamless steel distributing pipe cast in the crankcase. Pistons and cylinders are lubricated by splash system and the timing gears by pressure system.

The fan bracket support is cast integral with the gear case cover. The starting crankshaft has a four-point jaw, forged integral and case hardened.

All the engines of the Buda line have fastenings for three-point suspension. The forward end of

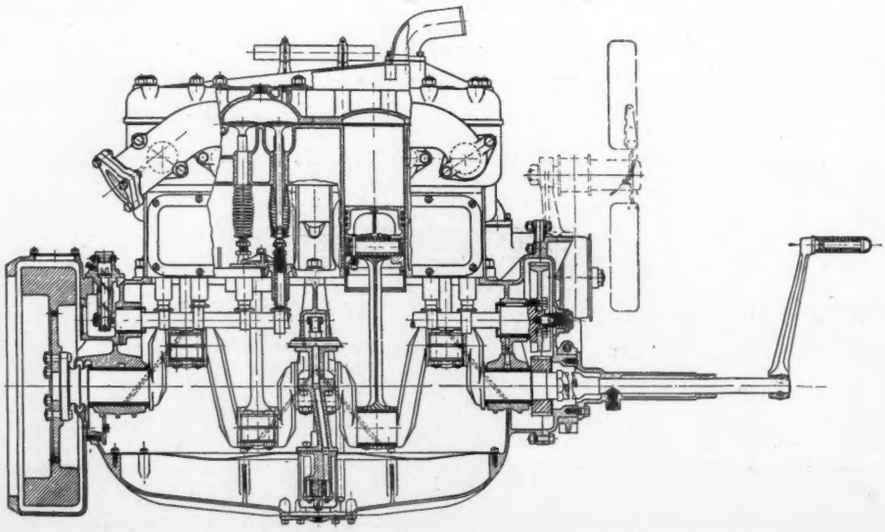
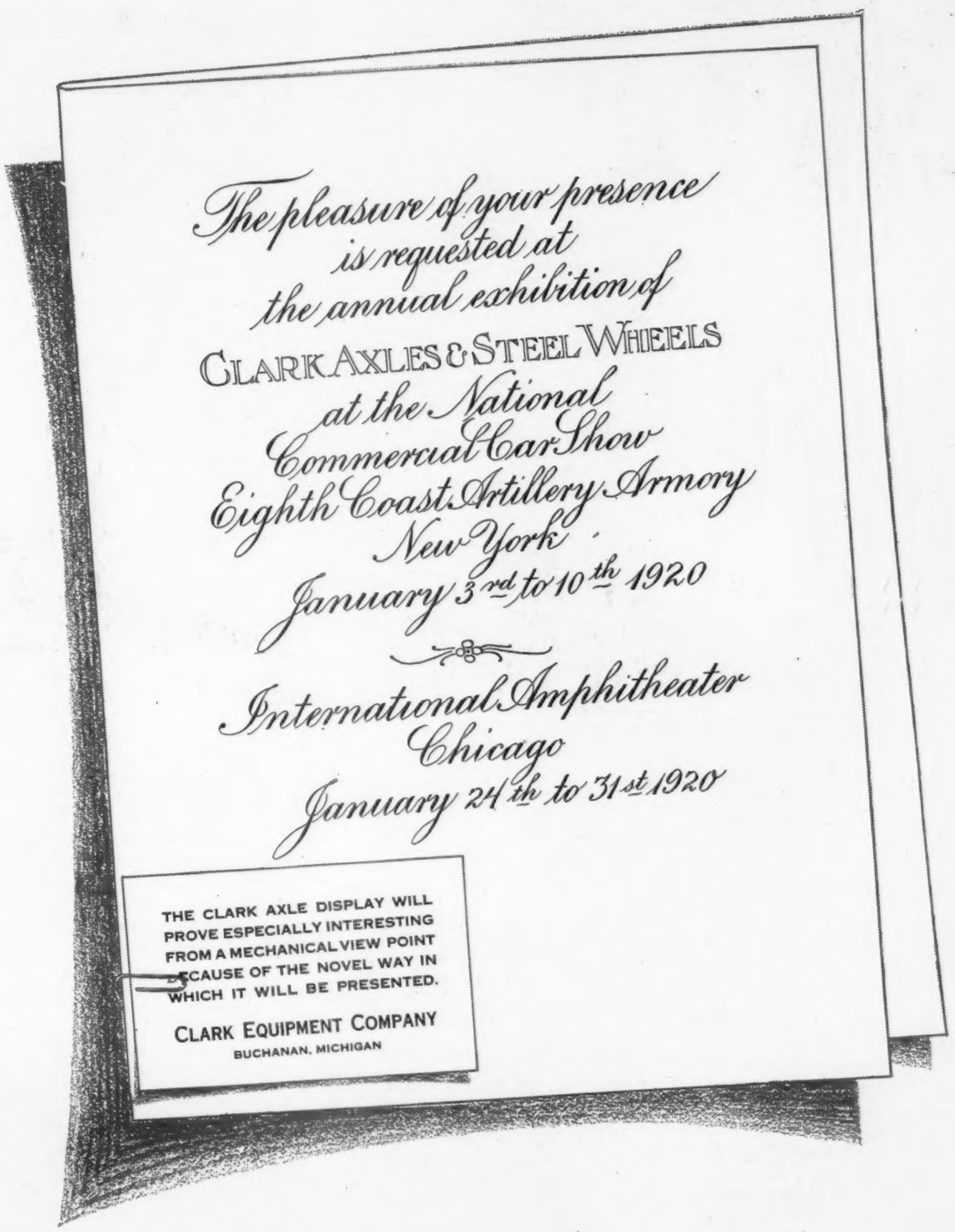
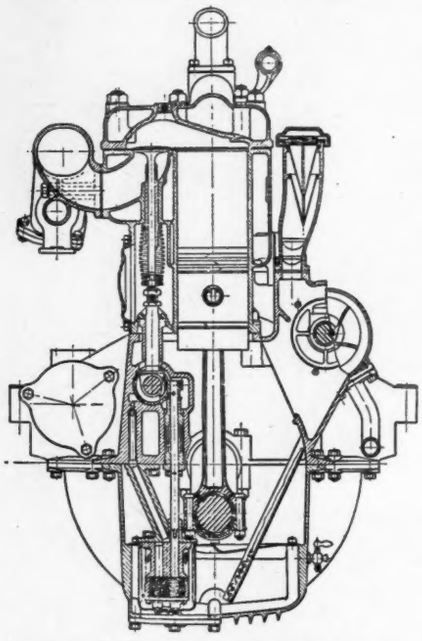


Illustration Gives a Comprehensive Insight of General Construction of the New Buda Line


The pleasure of your presence
is requested at
the annual exhibition of
CLARK AXLES & STEEL WHEELS
at the National
Commercial Car Show
Eighth Coast Artillery Armory
New York
January 3rd to 10th 1920
International Amphitheater
Chicago
January 24th to 31st 1920
THE CLARK AXLE DISPLAY WILL PROVE ESPECIALLY INTERESTING FROM A MECHANICAL VIEW POINT BECAUSE OF THE NOVEL WAY IN WHICH IT WILL BE PRESENTED.
CLARK EQUIPMENT COMPANY
BUCHANAN, MICHIGAN

the engine is supported at the crank center by a large trunnion bracket which rests upon the drop cross member of the frame. The rear arms are strong and cast integral with the upper half of the crankcase. Dimensions for installing a Buda engine are such that the car builder can select a small engine for a solid tire equipment or a larger and more powerful engine for pneumatic tire service to secure greater speed and still have the same mounting dimensions.



Showing the Section Across One of the Buda Engines

Provision has been made for all accessories. Starting and lighting equipment can be readily installed and ignition cared for by a magneto mounting. A governor pedestal is mounted at the end of this cylinder, and carries a vertical shaft driven by the camshaft.

Liberty Chemical Specialties

Soaps, greases, anti-freezing solutions and many similar products comprise the line offered to the trade by the Liberty Chemical Works, 352 E. Illinois St., Chicago, Ill.

The soaps which are sold in barrels containing 500 lb. are divided into two classes, number 1 and 3. The former sells at $.10½ a lb. in barrel lots and the latter $.06½ a lb. by the barrel. These soaps contain no animal fats nor excess alkali and are for washing anything finished with varnish, giving it a polish and lustre similar to that when the varnish was first applied.

The grease compound consists of cup grease, Liberty fibre grease, gear compound and graphite grease.

They are made in various different gravities, known as 1 to 5 and are for lubricating all parts where oil is not necessary.

The Liberty Metal Polish is for use on brass, nickel, gold, silver and steel. It does not contain acid. This polish is applied with a cloth and polished to a bright finish with a dry cloth. It sells at $.80 a gal. can.

The Anti-Freezing Solution is another item of the Liberty line. It contains the denatured alcohol and refined glycerine. In 50 gal. barrels the price per gal. is $.60. Other products of this concern are the liquid wax for polishing bodies, auto body polish, the Liberty Gasket-Lack, which is made of extra heavy and pure gum and used to cover gaskets before parts are put together: auto top dressing, tire dressing, tire talcum, enamels for lamps, fenders, cylinders and various color enamels for car finish. Paint that will resist the heat of the engines, exhaust pipes and other hot portions of the car is another product of this company. It is known as Heat-Proof Aluminum Paint, which in a ½-gallon can, one dozen to the case, sells at $1.90 each.

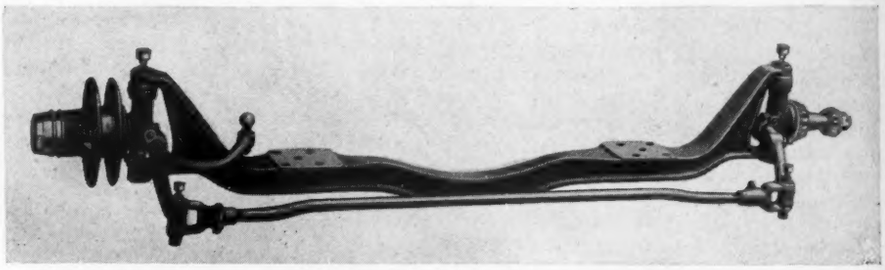
Stan-Par Truck Axle

EASE of adjustment, saving of weight, sturdiness and effective lubrication are some of the features in the new line of Stan-Par axles. The Standard Parts Co., Cleveland, O., is at the present time in quantity production with axles for trucks, trailers and passenger cars for a number of well known makers.

The entire construction of the Stan-Par semi-floating truck axle is strong and rugged. The shaft together with the other torque carrying members is so proportioned that it is possible to slip the wheels. An allowance also has been provided to compensate for the possibility of overloading. It is also claimed that power is provided on low gear, making it possible to use a small sized engine. The unique design of the worm drive which is of Stan-Par make, is well suited for carrying the high end thrusts imposed by the worm shaft.

The axle housing, which is of pressed steel construction, carries the load of the vehicle and also the torque incident to Hotchkiss drive. The spiral bevel gears permit the use of an unusually heavy tooth, which makes possible a reduction in gear diameters with a corresponding gain in road clearance. The right-hand spiral pinion is mounted between two Bock bearings. The forward bearing is unusually large, taking both the spiral thrust and the whip of the propeller shaft. This construction, insuring lubrication, dispenses with the necessity of having grease cups on forward bearing.

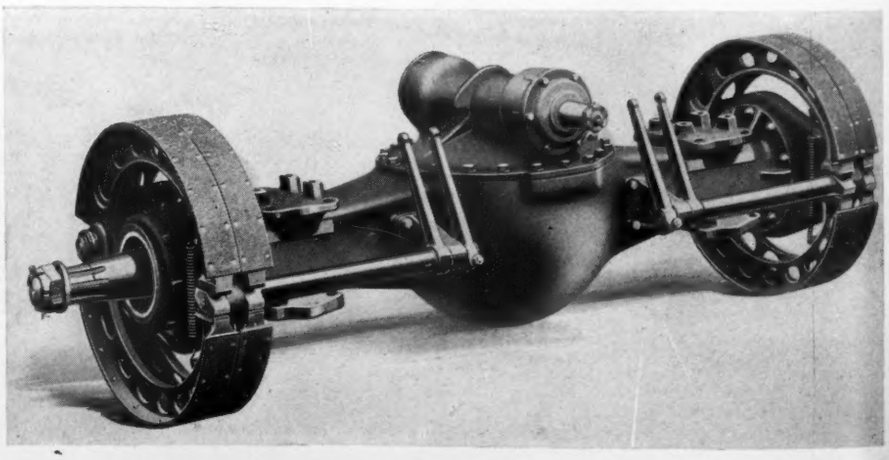
The live axles are mounted on two Bock bearings on the outer end of the shaft. These bearings take both the weight and the side thrust.



The Stand-Par Front Axles Are of the Elliott Type

The brakes are of internal expanding type with cam-actuated, self-centering shoes of the Baker type.

The Stan-Par front axles are of the Elliott type, carried by two Bock taper roller bearings of large dimension. The king pin bearings are of liberal size and are spaced so as to minimize the unit pressure. The wheel center is kept close to the king pin which makes for ease of steering as well as reducing the stresses in the pivot axle.



The Entire Construction of the Stan-Par Semi-Floating Truck Axle is Strong and Rugged

1. *Two-ton Garford owned by Cincinnati Moving Company of Cincinnati, Ohio, has run 14,000 miles on "NOBBIES."*
2. *White, 1½-ton truck owned by Summerfield Company has averaged better than 15,000 miles on "NOBBIES" in and about Boston, Mass.*

NOTHING has done more to increase the popularity of 'NOBBY CORDS' than the downright effectiveness of general hauling.

The moving van industry—sold forever on 'NOBBY CORD' cushioning power, plus economy, have forwarded these compliments—"The Cincinnati Moving Company's two-ton Garford is riding on the original air of a year ago. These tires have no less than 14,000 miles to their credit and have reduced our upkeep 30%."

Quoting the Summerfield Company—" 'NOBBIES' on our 1½-ton White have given us better than 15,000 miles and never off the rim; we recommend 'NOBBIES' to our friends."

If your trade is looking for real economy in hauling, inform them that—

'Nobby Cords' Save in Every Phase of Truck Operation

Fender for Ford Trucks

A new item has been added to the Peerless line of Ford products made by the Corcoran Mfg. Co., Cincinnati, O. It is known as the New Peerless Crown Fender for Ford trucks. A specially designed fender is also made for wheels equipped with 32 x 4½ in. pneumatic tires.

The clearance across the base of the fender is 30 in. and the height from the base to the top 20 in. They are made of heavy gage steel finished with two coats of Japan baked on. With this fender are furnished two heavy wrought iron brackets with accompanying bolts and washers. The weight per pair in a crate is 40 lb. They retail at $7.50 per pair.

The No. 3 Peerless Crown Commercial Fender is built exclusively for the Ford one-ton solid tire trucks and converted truck units. The specifications are very similar to the other model, except that the width of the base is 40½ in. and the height 17½ in. The price is $6 per pair.

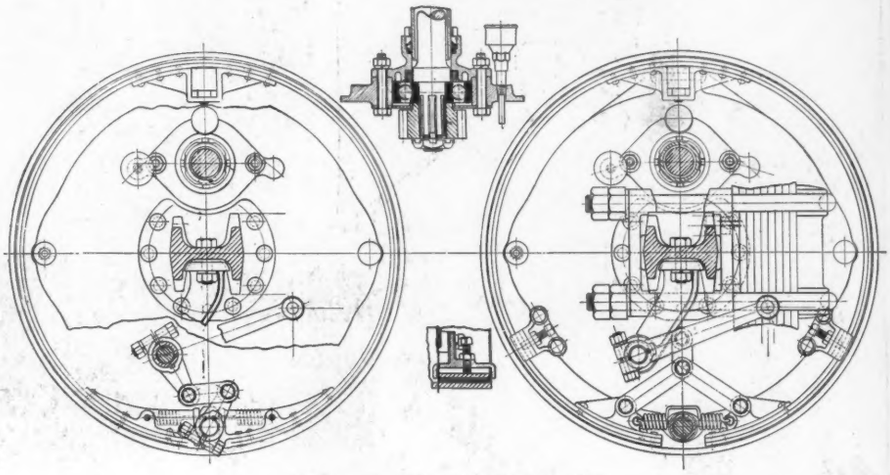
Torbensen Announces a New One and a Half Ton Axle

A NEW axle of internal gear type is announced by the Torbensen Axle Company of Cleveland, O., which will be ready for delivery by January 1. This axle is of an improved design although a number of the features of the regular Torbensen axle are retained. This new axle, known as Model B, is designed for 1½-ton trucks and has a maximum load capacity of 5400 lb. on the spring pads.

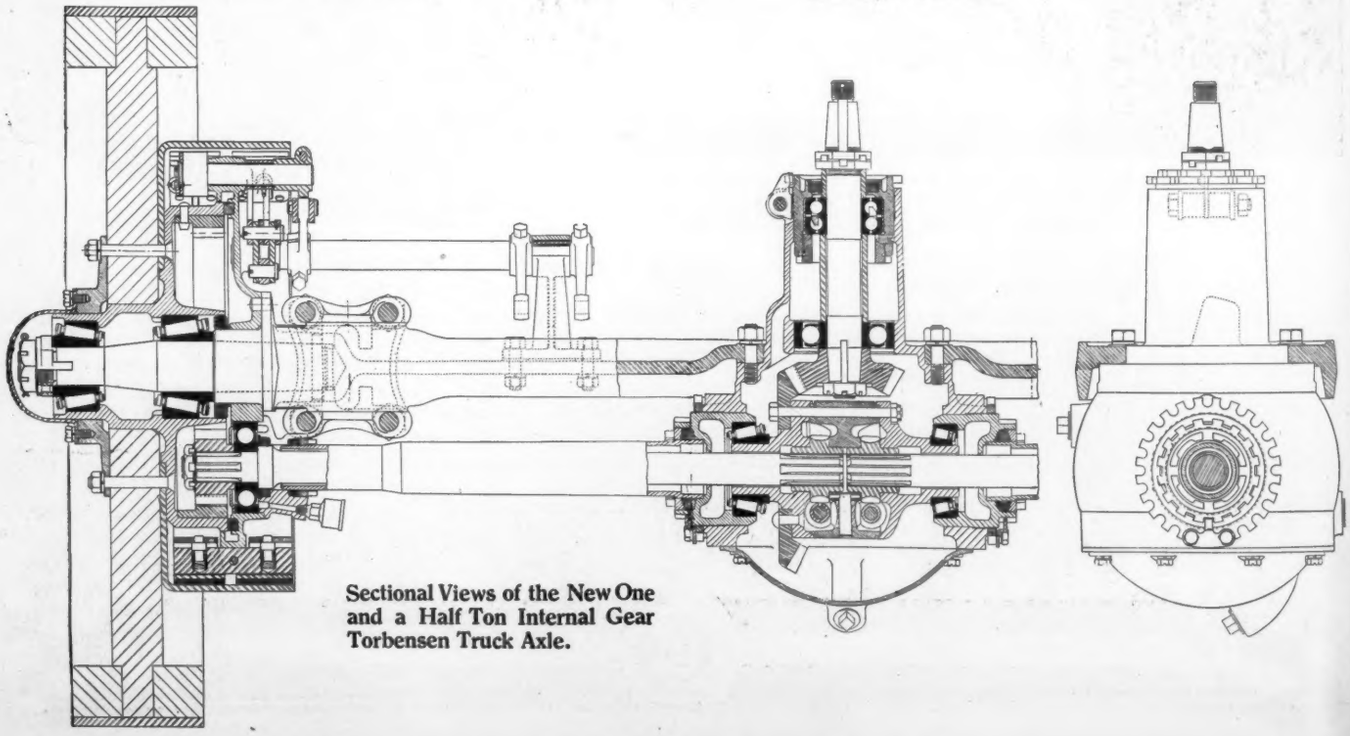
Among the features noted are the following: Ball bearings are used on the pinion shaft instead of taper roller bearings; the differential is a Powrlok, which gives positive traction on both wheels at all times; the drive is through spiral gears, eliminating noise and insuring smoother running; both brakes are of internal design, the external brake having been eliminated, which design allows greater clearance for the use of pneumatic tires; the special method of holding the internal gear felt provides a continuous oil channel running around the hub felt. The internal gear is pressed inside the hub, thus eliminating any possibility of its coming loose. The differential carrier is of one piece design and replaces the two piece carrier formerly used. Differential bearings are carried in cages and are solidly locked after adjustments are made. Oil leakage is prevented in the jack shaft by use of felt adjusters. These adjusters are used to compress the felt on the jack shaft cover tube and eliminate all leakage of oil. The oil filler is located in back of the differential carrier, making it easy to fill the housing.

The specifications of this axle are:

Load maximum	5400 lb. on spring pads
Engine capacity	27 hp. at 1000 r.p.m.
Reduction ratios,	7.6:1 std., 8.5:1, 6.1:1 min.
Tread	56¼ in.
Differential bearings	Timken
Wheel bearings	Timken
Drive shaft bearings	New Departure
Jack shaft bearings	New Departure
I-beam section	3¼ x 2¼ x ½ in.
Diameter of spindle	2 in.
Diameter of jack shaft	1¼ in.
Spring centers	39½-37 in.



Diagrams, Showing Construction of Brake Mechanism



Sectional Views of the New One and a Half Ton Internal Gear Torbensen Truck Axle.

The Lineman

"Call Anyone, Anytime, Anywhere"

Thus reads the invitation of the present-day telephone system, with its intricate network of communication lines from coast to coast.

IN maintaining this marvelous system, great responsibility devolves upon the lineman.

His service car must go speedily and surely; it cannot choose time, nor place, nor roads.

It is under such strains of service that dependable tires are most thoroughly tested, most appreciated. They cannot fail.

Fisk Solid Tires are the kind that can endure the hardships of the telephone service car. They are equal to every emergency—weather, bad roads, severe punishment. They are proving it every day, giving long service, uninterrupted usefulness.

That's because **Fisk Tires** are designed correctly and built faithfully to an ideal—

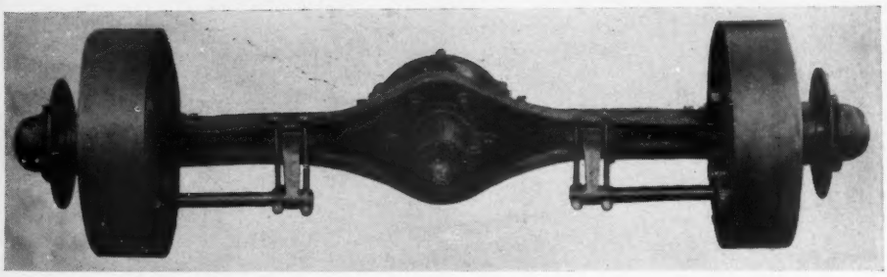
FISK IDEAL:

"To be the best concern in the world to work for and the squarest in existence to do business with."

FISK
F
TRADE MARK

FISK TRUCK TIRES

SOLID and PNEUMATIC



View of the Torbensen Rear Axle Assembled and Complete. Note the Absence of Exposed and Complicated Parts

Width of spring .....3 in. max.
Spring clips .....⅝ in.
Width of spokes .....2 in. min.
No. spokes per wheel.....14
Outside dia. of drum wheel brake, 17½ in.
Width of brake drum wheel brake, 5 3-16 in.
Type of service brake.....int. toggle
Type of emergency brake.....int. cam.
Width of brake bands, wheel brake..2 in.

Atwater Kent New Ignition System for Fords

THE Atwater-Kent Mfg. Co., 4937 Stenton Avenue, Philadelphia, Pa., is in production with a new starting and lighting system for the new style Ford engine and the new type CA ignition system for Ford cars of 1919 model or later. These new systems were exhibited at the Automotive Equipment Association at Medinah Temple, Chicago.

These new systems are applicable to the new style Ford engine only. Ford cars that are equipped with electric starting and lighting may use the ignition system.

The six-volt single wire starting and lighting system includes a starting motor said to be capable of handling the Ford engine under any condition. The maker claims that the battery will receive approximately the same charge under either day or night operating conditions, because the generator automatically varies its output to meet the changing conditions of day and night driving. At night, when the lights are switched on, the output is automatically increased, thus taking care of the increased current demand; vice versa, the switching off of the lights automatically decreases the output.

This system is complete in every respect and includes, in addition to other standard parts, an Exide storage battery, ammeter and carburetor choke lever.

An electrical check valve is operated by an automatic cutout, which is mounted on top of the generator. This automatic cutout automatically connects the charging circuit when sufficient current is being generated to charge the battery, and it opens automatically, preventing any reverse flow when the generator voltage drops below that of the battery. The generator is protected by a small fuse mounted on the cutout box. The series wound motor is satisfactory for all Ford demands under winter conditions.

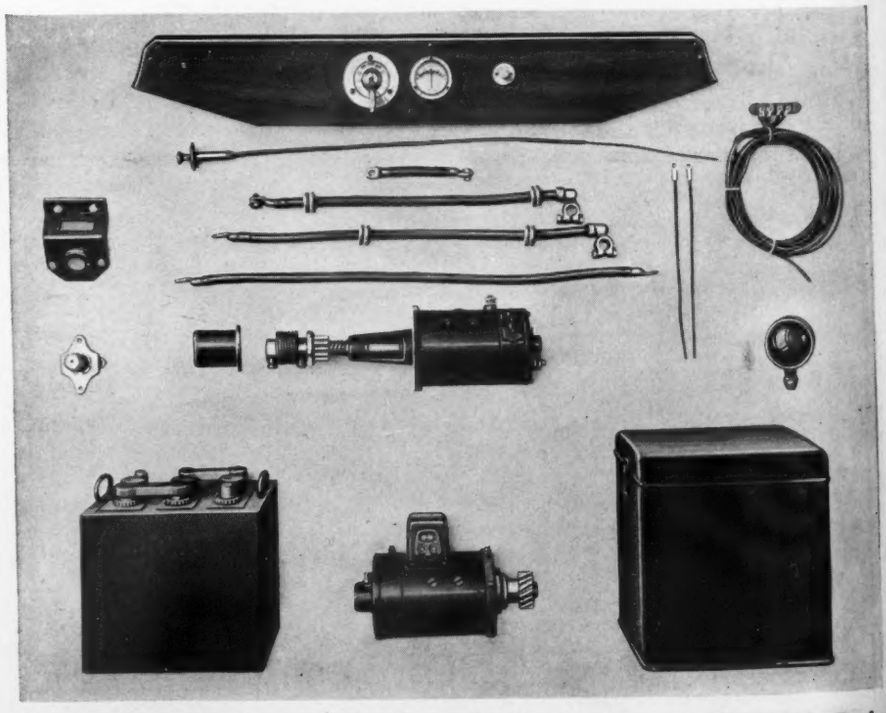
A standard Bendix drive is used to engage the starting motor with the engine. The brushes and commutator are of large size and completely protected.

The generator and starting motor are interchangeable and consist of the following units: Generator with cutout; fuse and driving gear complete; starting motor with Bendix drive and housing complete; Exide storage battery capable of developing 80 ampere hours; battery box; combination lighting and ignition switch; instrument board and ammeter; electric tail lamp and bulb; extra heavy carburetor choke lever; starting switch and starting cables; lighting wires; bolts, nuts, screws, washers and staples. The outfit complete weighs 157 lb., and the price is $97.

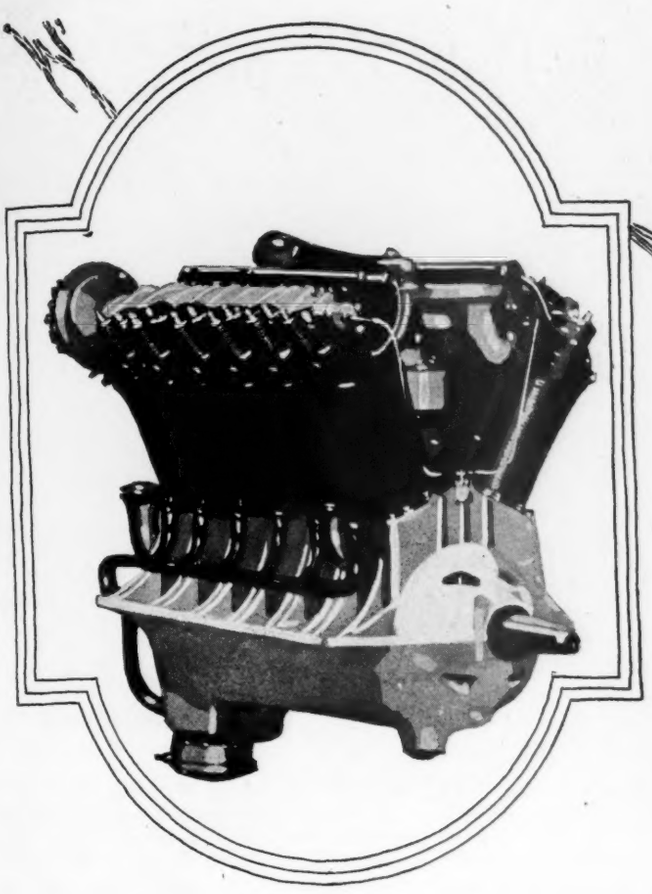
Type CA Atwater-Kent ignition system is adaptable only on Ford cars that have the electric starting and lighting equipment. This system is a closed circuit system. The two most important units of this system are the unisparker and coil. The unisparker combines a contact maker, a condenser, a high tension distributor and an automatic start governor. The contact maker, which is of their own make, consists of a rugged steel contact arm with a special composition fibre tip resting on a hardened steel cam. This rotates at half engine speed. Each time that the contact points are opened by a cam, of which there are four corresponding to the cylinders, a spark is produced at the proper spark plug. The condenser is mounted upon the contact maker, which in turn is covered by the distributor. All rubbing contacts are avoided as the distributing block serves as a distributing point without actually touching them. A centrifugal governor mechanism in the base of the contact maker provides for the automatic spark advance as the engine speed increases and retards it for starting at low speeds in traffic or over rough roads. An auxiliary spark lever provides for manual advance in connection with the automatic advance.

The coil consists of an iron core with primary and secondary windings sealed into an insulating tube. This unit steps up the low voltage primary current to the high voltage secondary. A resistant unit, located on the top, regulates the current automatically.

This system, weighing 19 lb. and selling for $24, comprises the following items: Type CA unisparker mounted on special casing to fit new Ford engine; spiral drive gear; Type CA Atwater-Kent coil; wiring complete with terminals attached; spark lever; cotter pins, two for fan pulley; four screws for attaching coil to dash; switch connection; two wiring brackets; socket wrench; dash cover plate and instruction plate.



Parts Comprising the Atwater Kent Starting and Lighting System for New Model Fords

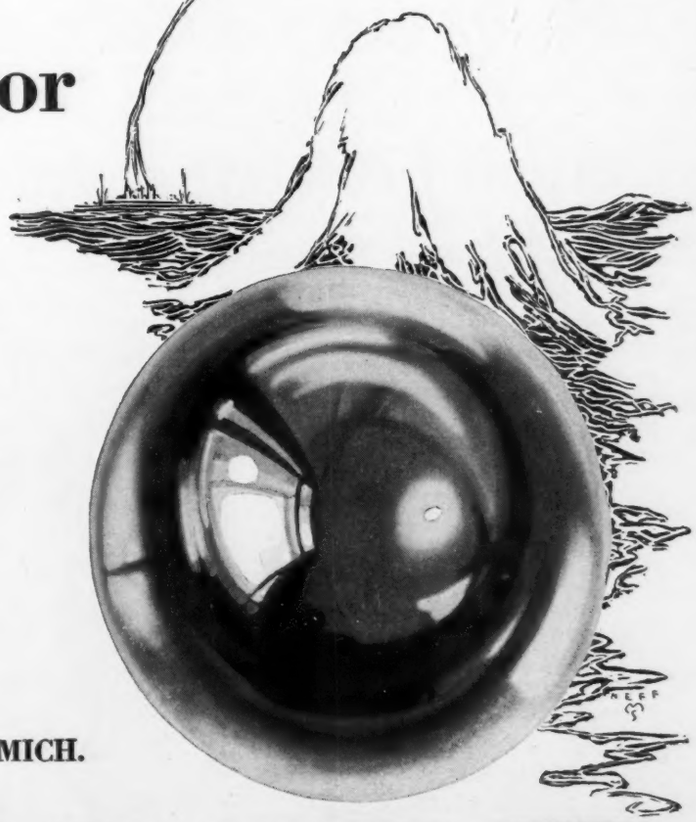


The Liberty Motor

America's Masterpiece for the Quest of the Air

Where friction, causing loss of power and burning out of units, would rob man of glory, ball bearings provide safety and security.

The Hoover Laboratories have fashioned heat treated steels into perfectly round and velvety-smooth steel balls that retard friction's development. This is the Hoover Steel Ball's gift to safety and progress.



HOOVER STEEL BALL CO., ANN ARBOR, MICH.

HOOVER
STEEL BALLS

Erd Brings Out New Heavy-Duty Tractor Engine

THE Erd Motor Co., Saginaw, Mich., is in production with a new heavy-duty engine which is noted for its fineness in design and construction. This new Erd engine which is the result of eighteen years of engine building, gives evidence of the growing tendencies to depart from the heavy clumsy designs so long thought necessary in a heavy-duty engine, or any engine subject to strenuous service. This new model, which was announced recently, has a bore of 4½ or 4¾ in. and a stroke of 6 in.

The cylinders, four in number, are cast in block with the water jacket which extends from flange to flange. The ample water spacing, provided in the removable cylinder heads, do much towards cooling the lower ends of the valve stem guides and also the spark plugs. The entire valve mechanism which is of the overhead type is carried in this removable cylinder head.

The connecting rods, which are of the conventional I-beam section and 12½ in. long, carry heavy pistons firmly secured to the connecting rods by wrist pins, which in turn are held by screws in the piston bosses.

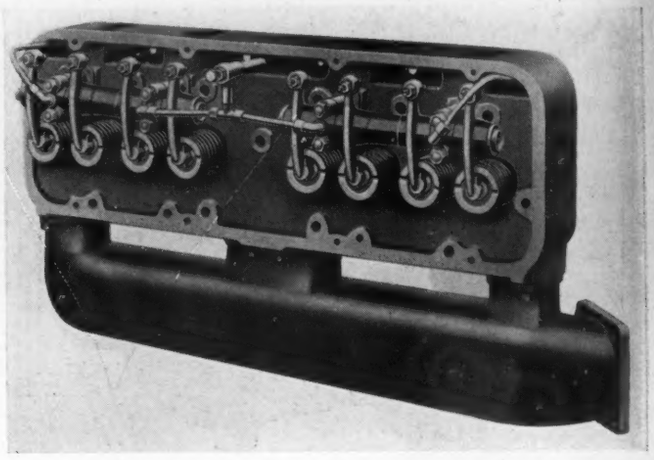
All mechanism has been inclosed against dust and foreign material. The removable head is inclosed in an aluminum cover. The design of the cylinder block here also keeps out the dust from the push rods and tappet guides. The construction of the breather in the cylinder head cover, consisting of sheet steel and leather disks, also tends to exclude the dust.

The rocker arms, rocker-arm shaft and rocker-arm stands are assembled as one unit so that it is easy to remove and adjust them. A ball joint on the rocker arm permits proper adjustment of the push rods.

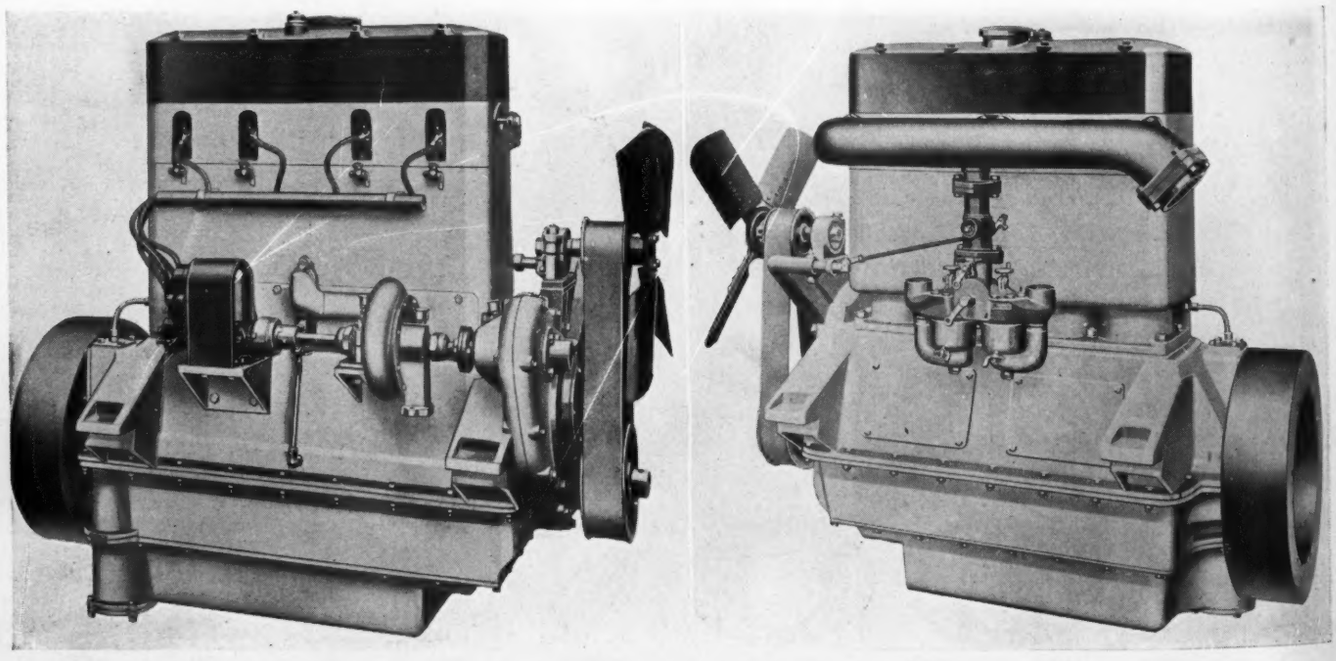
Accessibility is another factor of importance in the design of the new Erd engine. Two large inspection holes in the left side of the crankcase render easy access to the connecting rods. Another cover enclosing the timing gears can also be readily removed when necessary. Still another cover plate at the back end of the engine permits access to the cam gear which is keyed and locked to the camshaft. The fan can be adjusted by a simple eccentric mechanism directly behind the fan. The spark plugs are on the right side of the engine, while the manifold is on the left side. This enables convenient placing of the plugs without danger of burns. The timing cups are also on the right side of the engine.

The front camshaft, the tappets and guides can be removed without dropping them into the crankcase through two large inspection apertures in the side of the engine block. The front camshaft bearing which is a bronze bushing in a cast iron bearing, is held in place by two flat headed screws, and the camshaft can be readily pulled out without interfering with other parts by removing the screws.

Lubrication is through a force feed and splash system. The oil is circulated by a vertical gear pump which is located in the bottom of the rear end of the oil pan. The power operating the oil pump is obtained from a vertical shaft actuated by spiral gearing off the rear end of the camshaft. The lubrication system acts as follows: Oil enters through the filler on top of the engine and flows down around the valve push rod into a large capacity cast oil pan. Before entering the gear pump at the bottom of the crankcase, the oil is thoroughly cleaned of dirt by a fine mesh screen. From the gear



View of the Overhead Valve Mechanism and Manifold. This New Engine Developed Fifty-Six Horsepower at 1200 R. P. M. Under Test.



Right and Left Sides of the New Erd Tractor Engine. Note the Departure From the Former Clumsy Tractor Design

The Resiliency is Built in the Wheel

It Is This Sewell Rubber Roadbed

Built in the Wheel

That Receives and Absorbs the Road Shocks

All road shocks are picked up at the point of contact with the road by the Sewell Rubber Cushion and distributed over forty per cent of the wheel. So, these Road Shocks are ***Diverted Away*** from the Hub, the Axle, the Bearings, the Mechanism of the Truck. That is the action of the Sewell Principle—"The Resiliency Built in the Wheel."

What is the Sewell Rubber Cushion?

It is a continuous, permanent Roadbed of Soft Rubber, that does not and cannot wear out because it is not in contact with the road. The Motor Truck always carries this Rubber Roadbed with it, because it is literally "Built in the Wheel."

You buy this Sewell Rubber Roadbed when you buy your Sewell Wheels and it lasts as long as the truck lasts. No delays, no replacements, no repairs. When you buy the Sewell Rubber Roadbed you make a Permanent, Profitable Investment.

During the next five months, when road conditions are the worst, is when Sewell Wheels will pay you one hundred per cent on your investment.

The Sewell Rubber Roadbed is the reason why the country's largest truck owners have unreservedly adopted the Sewell Principle—

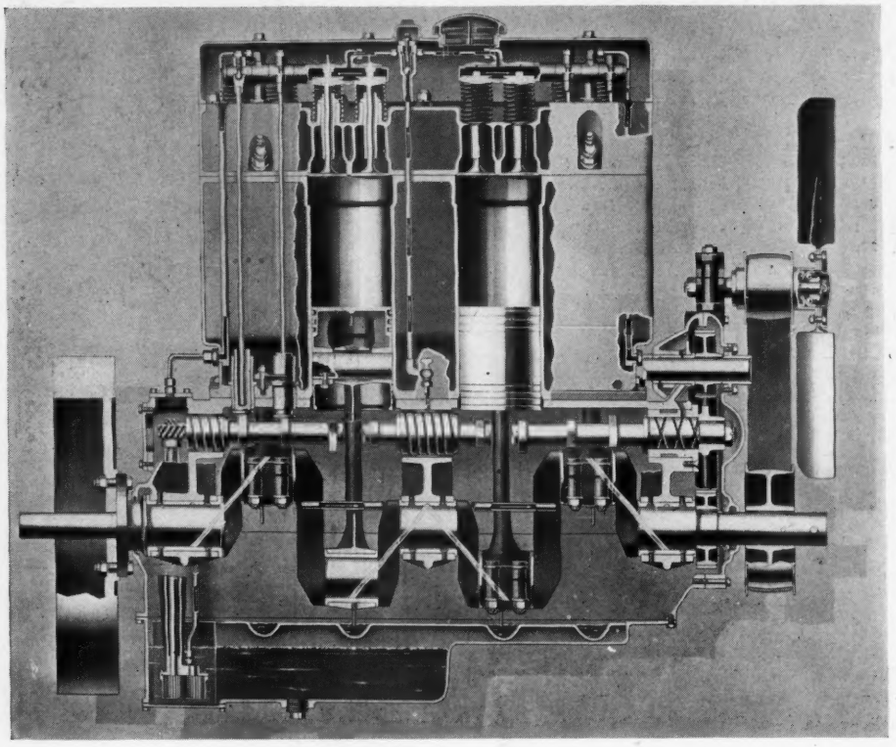
"The Resiliency is Built in the Wheel"

Sewell Cushion Wheel Company, Detroit, U. S. A.

Sewell Cushion Wheels

pump the oil is forced through the main feed pipe and conducted to the three main bearings. The pressure can at all times be noted in the pressure gage on the engine. Oil is forced into the hollow crankshaft through a hole which registers constantly with the groove in the main bearing bushings. The oil in the hollow crankshaft reaches the connecting rod bearings by entering the groove through other holes in the crankshaft. Cylinder walls are lubricated by the throw-off. A ball check valve limits the pressure in the main feed pipe. This can be adjusted without removing the engine cover. The valve rockers and contacts are lubricated by excess oil which circulates through the hollow rocker-arm shaft. The oil that escapes from here flows down to the oil pump drive gears and then continues on to the front engine gears.

The cooling system includes a centrifugal water pump. Provision is made for attaching any standard type of magneto or ignition system. Carburetor is optional. The size of the carburetor inlet is 1½ in. The crankshaft is 2½ ft. long and the main bearings from front to rear are 3½ in. and 4½ in. long, respectively. The connecting rod bearings are 2⅜ in. and 3¼ in. long. Either 4-point suspension with exposed flywheel or 3-point suspension with standard S. A. E. bell housing for unit construction can be furnished. The engine weighs about 1100 lb., is 46 15-16 in. long, 43⅛ in. high and 24 in. wide.



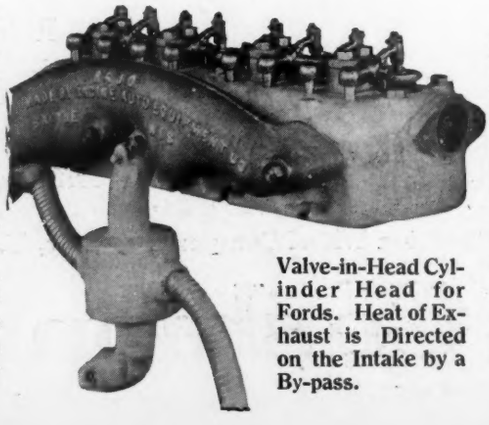
Partly Cutaway and Sectional View of the Right Side of the Latest Erd Tractor Engine. The Lubricating System is Easily Traced

The exhaust manifold has a by-pass and pipe that directs hot fumes to the jacket on the intake and heats them before they reach the engine. Another feature is the elimination of back pressure in the exhaust system, since the area is greatly increased and the exhaust carried off by a 2¼-in. flexible tubing 54 in. long. The price of this outfit is $78.50.

Rajo Cylinder Head for Ford Engines

The Trindl Co., 57 E. 24th St., Chicago, is the sole distributor for the Rajo Valve-in-Head Cylinder Head for Ford cars, made by the Racine Auto Equipment Co., Racine, Wis. This outfit is known as the Model 30 and is designed to give the engine more power, flexibility and mileage from the fuel consumed. The maker states no changes are necessary to install this model and the same carburetor can be used.

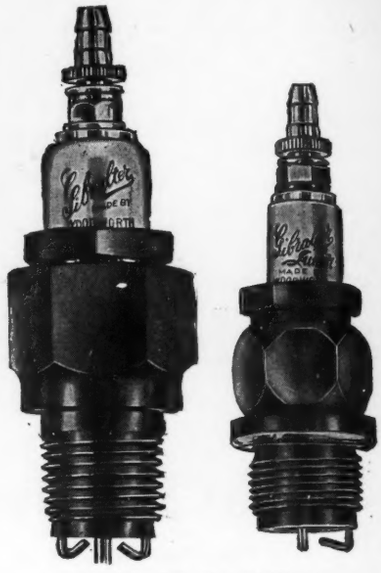
The cylinder head itself is made of cylinder iron. The combustion chambers are accurately machined to insure even compression in all the cylinders. The valves are made of Tungsten steel and have a 1⅝-in. clear diam. The valve springs are made by the William Gibson Spring Co., specialists on high quality springs. The rocker arms are drop-forged of high grade steel and the push rods, rocker shafts and adjustment screw are hardened steel. Another feature of this cylinder head is the ease of adjustment of the rockers.



Valve-in-Head Cylinder Head for Fords. Heat of Exhaust is Directed on the Intake by a By-pass.

Woodworth Gibraltar Plugs

The Woodworth Gibraltar Spark Plug is being manufactured in two styles, large and small. The Woodworth Gibraltar Spark Plug is the larger one of the two. It is of extra large size and built to stand up under the hardest kind of service. The porcelain is large and made of cornish Kaolin. It is made in ½-in., ⅞-in., also in these sizes with an extension. The price is $1 each.



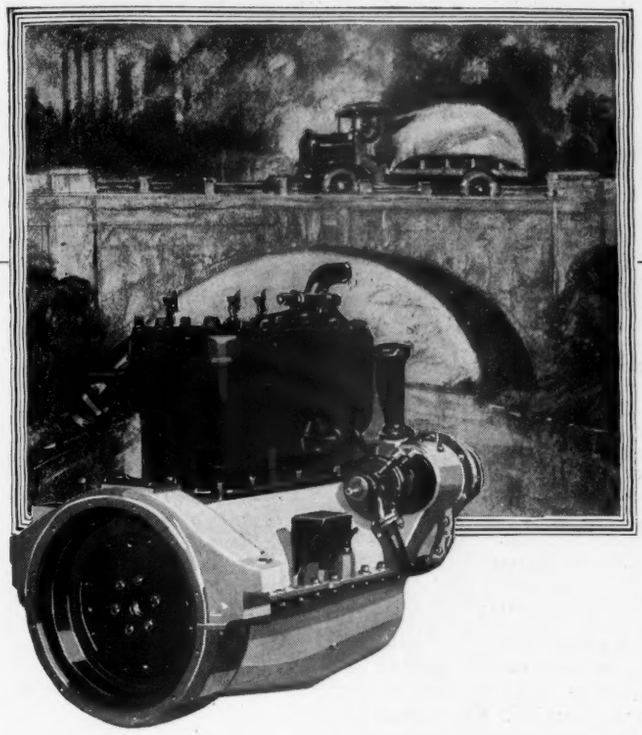
Woodworth Spark Plugs

On the left is shown the Gibraltar spark plug and on the right the Gibraltar Junior spark plug

The Woodworth Gibraltar Junior Spark Plug is made of the same materials as the larger model, except that the shell and porcelain is smaller. It is made in the same sizes and sells at $.75 each. These plugs are made by Woodworth Mfg. Corp., Niagara Falls, N. Y.

Union Switch & Signal Company, Swissdale, Pa., have recently issued a new illustrative and descriptive bulletin of many new parts added to their range of products. Particularly in heavy drop forgings for truck, such as axles, spindles, knuckles, brake bands, etc. The addition in the last six months of six new steam hammers up to 6000 lb. has enabled the company to produce 1500 tons of forgings per month.

Clyde Cars Co., Clyde, O., manufacturers of the Clydesdale trucks, has changed its name to the Clydesdale Motor Truck Company.



It has been the constant aim of The Buda Company to build for high quality rather than huge production—to produce an engine able to perform, to the most gratifying degree, the work for which it is intended.

Quality performance, such as rendered by the Buda engine, is recognized more and more as the vital factor contributing to the maximum measure of truck service satisfaction.

Because of the confidence-inspiring ability of the Buda engine to deliver punctual and profitable power it is being more and more widely selected as standard equipment in quality built trucks.

Truck owners have repeatedly proven that the Buda engine affords a definite protection against high maintenance and repair costs and assures to their trucks the greatest number of days in active service.

THE BUDA COMPANY, *Harvey* (CHICAGO SUBURB), *Ill.*
ESTABLISHED 1881

BUDA
The
ENGINE

Metal and Rubber Markets

Mills Slowly Recovering From Strike

There is a slight improvement noted from week to week and the mills are gradually recovering from the effects of the strike, but there is still a shortage of labor, as a result of which orders are very much retarded in their delivery.

There is a continuously growing demand for basic and semi-finished steel as well as finished products. The mills are working at the fullest capacity possible, which is about 15 per cent. below the output when the strike began.

Prices in some lines are advancing because some of the buyers are so insistent that they are willing to pay premiums in order to obtain early delivery. However, the aim of the principal producers has been to hold the market in check so the old law of supply and demand cannot be said to apply.

Steel Products Prices

Per ton, Pittsburgh—			
Bessemer billets	$42 00	a	....
Open hearth	42 00	a	....
Forging billets	57 00	a	....
Sheet bars	45 00	a	....

Sheets

The following prices are for 100-bundle lots and over f.o.b. mill:

Blue Annealed Sheets—			
Pittsburgh (base)	$3 55	a	....
Philadelphia	3 79	a	....
Chicago	3 82	a	....
Galvanized Sheets of Black Sheet Gauge—			
Pittsburgh	$5 70	a	....
Chicago	5 97	a	....
Tin—Mill Black Plate			
Pittsburgh	$4 35	a	....

Tin Plate

Tin plate, pme, per base box.	$7 00	a	....
Terne plate, I. C.	7 05	a	....

Iron and Steel at Pittsburgh

Bessemer iron	$32 90	a	....
Bessemer steel, f.o.b. Pitts...	42 00	a	....
Skelp, grooved, steel	2 45	a	....
Skelp, sheared, steel	2 65	a	....
Ferromanganese (80%)	110 00	a	....
Steel, melting scrap	22 00	a	....
Steel bars	2 75	a	....

Copper—Copper prices are on a constantly descending scale in spite of all attempts made to hold them up. Buyers are holding off, as is usual on a descending market, and only those in actual need are purchasing. December copper was quoted at 18¼ cents on November 28.

Aluminum—Demand continues quiet. Virgin metal in ingots, 98-99 per cent., is quoted at $32 a 33.

Tungsten—The demand is slight, owing to the continued uncertainty of tariff legislation. Chinese wolframite is quoted at $7 per unit and Bolivian at $10.

Other Metal Products

The following prices are current for brass and bronze products:

Copper sheets, not rolled	31 50	a	....
Copper bottoms	39 50	a	....
Seamless tubing, bronze	37 00	a	....
Cut lead sheets	9 75	a	....
Copper rods	22 00	a	23 00
Copper wire	23 00	a	24 00
High brass wire	26 25	a	....
High brass sheets	26 25	a	....
High brass rods	24 75	a	....
Low brass sheets	28 75	a	....
Low brass wire	28 75	a	....
Low brass rods	29 50	a	....
Brazed tubing, brass	38 00	a	....
Brazed tubing, bronze	43 25	a	....
Seamless tubing, brass	33 50	a	....
Seamless tubing copper	34 50	a	....

Prices of Old Metals

Aluminum scrap remains unchanged and is in active demand. Copper is about ½ cent lower than previous quotations. The market is quiet.

	Buying.	Selling.
Aluminum—		
Cast scrap	22¼a23¼	25¼a25½
Sheet scrap	21¾a22½	24 a24½
Clippings	24½a26	27 a28
Copper—		
Heavy machinery comp.	14½a14¾	16 a16¼
Heavy and wire	13¾a14	15½a16
Light and bottoms	12½a12¾	13½a14
Heavy, cut and crucible.	15¾a16	17½a18
Brass, heavy	7½a 8¼	8¾a 9¼
Brass, casting	10⅛a10⅜	10¾a11½
Brass, light	5⅞a 6⅜	7½a 8¼
No. 1 clean brass turn'gs	8⅛a 8⅜	8½a 9
No. 1 comp. turnings	11½a12	13½a13¾
Tea lead	4¼a 4.40	4¾a 4⅞
Zinc scrap	4¼a 4½	5 a 5½
New zinc clippings	5¼a 5½	6 a 6½

Rubber Market Remains Unchanged

The undertone of the market is firm although there is no material change in the general situation. Only small lots are in demand. Speculators are absent from the markets and the factories are withholding for the present. The present tone is a reflection of the markets in London and the Far East.

Island, fine	48	a	48½
Island, coarse	21½a	..	
Caucho, ball, upper	35	a	..
Caucho, ball, lower	23½a	..	
Cameta	23	a	..
Plantation—First latex	53½a	..	
Brown crepe, thin, clean	47	a	48
Rolled crown, crepe	42	a	43
Smoked ribbed sheets	52½a	..	
Centrals—Corinto	35	a	35½
Esmeralda	35	a	35½
Guayule, wet	25	a	27
Guayule, washed and dried	..	a	....
Balata, block, Ciudad	76	a	78
Balata, block, Columbian	56½a	..	
Balata, block, Panama	42	a	43
Balata, sheet	*1 00	a	..
Mexican—Scrap	34	a	35
Slab	..	a	..
African—Maresi, red	..	a	..

*Nominal.

Scrap Rubber—Orders for lots of any importance are being withheld, which has a depressing effect on the tone of the market.

Tires—Automobile	3½a	..	
Bicycles, pneumatic	2½a	..	

Wisconsin Parts Company Operates Independently

Current rumors to the effect that the Wisconsin Parts Co. is controlled by certain motor truck interests is emphatically denied by the company. W. F. Rockwell, president and general manager, asserts that the number of stockholders in the Wisconsin Parts Co. is limited; that he is personally acquainted with all these stockholders, and can state positively that none of them have any interest in any motor truck or other accessory company.

The company further announces its intention to increase its facilities for production in both additional space and equipment.

The board of directors has authorized an addition to the main plant of a building 240 ft. in length. The directors also have authorized the purchase of a large amount of machinery to take care of the additional business on the books.

Mr. J. L. Armstrong, superintendent, resigned November 22, and was succeeded by Mr. F. R. Conroy, who was formerly connected with the Ingersoll-Rand Co., the Willys-Overland Co., the Garford Co., and who has just resigned from the Cadillac Tool Co. to join the Wisconsin Parts Co.

Many Hours Saved by Trucks

CINCINNATI, O.—Practically all of the local freight depots are to be motorized by January, 1920. Trucks are moving the freight from the Big Four freight depots and the service is about to be extended. Through the use of trucks the movement of commodities has been reduced by eight to twelve hours.

Motor Transport Corps, U. S. Army, is planning an exhibit of the various types of motor vehicles constructed for and used by the Army during the war, as well as many types of motors and vehicles brought out as a result of the war.

As far as is known at this time the exhibit will be held December 4, 5 and 6 in the First Regiment Armory, 16th Street and South Michigan Avenue, Chicago, Ill. Information as to space allotment, advertising, prizes, etc., may be obtained from the Motor Transport Officer, 230 E. Ohio Street, Chicago, Ill.

United States Light and Heat Representatives
Who attended the Service Station Convention of the corporation, which was held at Niagara Falls

REMOVING THE BRAKE

FRICTION is the relentless enemy of efficient operation. In the average mill it destroys at least 25 per cent of all the power produced or bought.

Yet this tremendous waste can be largely reduced—in fact, has been reduced to a minimum in hundreds of plants of every description through the aid of S K F Bearing Engineers.

These practical engineers, backed by the fund of knowledge constantly available in the S K F Research Laboratories, render an invaluable service. They remove the brake that slows down production by solving perplexing and costly friction problems.

Manufacturers are invited to avail themselves of this bearing service at any time

S K F INDUSTRIES, INCORPORATED
Sales, Service and Research Division
165 Broadway, New York City

(570)

SKF INDUSTRIES

Hess-Bright Ball Bearings
S K F Ball Bearings
Atlas Steel Balls
Gronkvist Chucks
Transmission Hangers

Columbia Truck Which is Being Driven From Pontiac, Mich., to Miami, Fla.

The illustration shows one of the Columbia Motor Truck & Trailer Company's new 1920 models, known as model G, a 2½ ton job with Hinkley, class B, engine; Detlaff, class B, disc clutch; Stromberg carburetor; Bosch magneto, etc. Mr. Habersham, the southern sales manager for Columbia trucks, is driving this truck, and in his daily telegrams to the factory, states that he has encountered very bad roads and miserable weather, but with all that the truck is doing fine. Bad roads necessitated a great deal of low gear work. In crossing Lookout Mountain two hours were consumed in low speed work without overheating the engine at all. Mr. Habersham is in southern territory lining up dealers and uses this truck for all of his traveling. A duplicate of this truck, with the exception that it has solid tires, on a trip from Pontiac, Mich., to Baltimore, Md., averaged 11¾ miles to the gallon, in spite of the bad roads between Pittsburgh and Baltimore.

A Three and a Half Ton Mack "AC" Dump Truck Being Loaded Preparatory to a One-Mile Run

It is owned and operated by the Dempster Construction Company, Knoxville, Tenn., is shown loading at the point of excavation that is being done in connection with the leveling off of a new athletic field at the University of Tennessee, Knoxville. The earth is hauled to a large excavation about a mile distant. The truck is equipped with a three-yard steel body, to which sideboards were later attached, increasing its capacity to six and seven yards. This truck makes on an average of thirty-four round trips per day. The owners estimate that on the basis for which they are being paid for the excavating the truck is earning a net revenue of approximately $130 per day, which is an actual saving of $60 per day.

The Locomobile Plea to Cancel Cross-Licensing Dismissed

NEW YORK CITY, Nov. 24—The case of the Locomobile Company of America against the National Automobile Chamber of Commerce has been dismissed by the United States District Court for the Southern District of New York. The Locomobile Company sued to have the Cross-Licensing Agreement declared null and void. This agreement, which was entered into by more than 100 manufacturers, provides for an exchange of patent rights without the payment of royalties. This has been considered a highly helpful arrangement by industry as a whole.

The bill was dismissed with costs and the statement that no leave to amend will be granted unless the complainant states its desire to have this right because it can bring in the lacking indispensable parties.

Novel Truck Delivery for the Freight Congested Southwest

The Southwest is steadily increasing its forces in the battle against long distances, poor transportation and haulage facilities.

The great demand for trucks in Texas is shown by the fact that the first train composed exclusively of motor trucks to be hauled any great distance was dispatched from Lansing, Mich., to Fort Worth, Texas, the latter part of November. The train, composed of 29 cars, and loaded with 100 Reo "Speed Wagons," was sent out of Lansing as a "through freight" direct to Fort Worth. This was also the largest consignment ever made at one time to a private concern.

"The demand for trucks in that part of Texas is very great," said Mr. Russell, of Stapleton-Brown Motor Co., of Fort Worth, Texas, in commenting on his huge consignment. "We, in Texas, cannot meet the demand which we have for Reo 'Speed Wagons' and the 100, which we have just shipped, will not enable us to make deliveries to all, who have ordered trucks. It is especially significant of the demand that every truck on the train was labeled with the name and address of individual or firm who is to receive it.

In discussing the freight congestion, Mr. Russell said, "Without a doubt, some of the 'Speed Wagons' on the train—and perhaps a large percentage of them—will be used in hauling freight from the embargo points to Fort Worth. I know of several instances in Fort Worth where merchants have waited over two months for merchandise which was held up at an embargo point, scarcely two hundred miles away."

The Illustration Below Shows the Huge Banners Which Were Attached to the Sides of the Cars as They Pulled Out of the Reo Yards, Lansing, Mich., on Their Way to Fort Worth, Texas

GARFORD

-for

Low Cost Ton-Mile

Garford

The Garford Motor Truck Co., Lima, Ohio

TRUCKS

Selden District Sales Managers Discuss Salesmanship

(*Continued from page 16*)

the speaker of the evening, gave the sales organization a heart to heart talk on salesmanship. The following are extracts which outline the speaker's viewpoint and should be of vital interest to all salesmen and sales managers:

Realizing that I am addressing men who have demonstrated that they are successful in the sales world, what I have to say will be said in a very informal manner and be rather a sales chat than an address.

I probably have an advantage—if it can be called such—over most of the men present, and that is age, for my experience in salesmanship covers a period of 27 years. The first three years I was one of the "knights of the grip-sack," and the last 24 years I have been engaged in building sales organizations.

There is no hard-and-fast rule for either judging salesmen or the buyer. We all feel we can judge a man by his type, but I have almost come to the conclusion there is only one type on which you can rely with any degree of certainty and that is the worker type.

Three Salesman Types

In a big, broad sense, you can divide salesmen into three classes—the brilliant man, who is a spasmodic worker, Class No. 1; the plugger, who lacks brilliancy, Class No. 2; the brilliant man, who is also a hard worker, Class No. 3. And say, boys, this last is the guy that gets to the top.

Men of the Class 1 type keep the home office and themselves in a continual turmoil. When they work they get results and everybody is pleased; but just as soon as they get results, they let up and take a rest and everybody gets sore, and both the man and the firm are always on the anxious bench. In one case the home office has just about concluded they will let him out, when along comes a good order or an especially good piece of work and he is reinstated again. The man gets results, loafs, gets results, loafs, and in between he gets remorse and makes up his mind that he is going to be a hustler, but not one in fifty ever reforms. Salesmen of this type slip gradually—with jobs here and there—into old age and become down-and-outers; so let this be a warning to any man here who may be brilliant but dislikes to work consistently and persistently.

The only way you can ever get to the top is by having ability, stability, reliability and dependability, and using these qualities every working day in the year. Why even the man in Class 2, the plugger, without brilliancy, will lead the spasmodic worker over the line.

Now comes the opportunity for the man who has the qualifications of salesmanship and a brilliancy surpassing that of his fellow-salesmen, and that is to utilize these God-given brains twelve hours a day, 365 days of the year.

While your director would unquestionably at all times welcome suggestions from you, he, nevertheless, is the general and you are his lieutenants. There should be the same discipline in a sales corps as there is in an army corps.

Jumping Over the Policy

Discipline in business is known as policy and sometimes men on the road feel that the firm's policy is either wrong or too rigid. They don't know all the things that are back of that policy. They don't realize that a little deviation may mean the opening of the flood gates of trouble. All that they know is that the policy sometimes stands between them and an order, and following what is the natural instinct of the salesman, they take the line of least resistance and try to jump over the policy.

The A No. 1 salesman takes a broader view of these things; he realizes that not only is he selling merchandise of the company that he represents, but he is also selling their business methods and it is just as essential for him to get the order in the shape the home office wants it, as it is to get the order. When the home office has a particularly attractive position to offer to someone in their organization, it goes not to the man who has made the most sales, but the man who has sold best, according to his company's policies.

Another word of caution. Everytime there is a complaint made by the dealer, don't immediately jump to the conclusion that your home office is wrong; that their methods are lax. No one can be in business without daily coming face to face with problems. Sometimes they are of one type, sometimes of another; but they are most frequently complaints from buyers. It should be your duty, and also your pleasure, to obtain the facts so you can convince the buyer that he is wrong. If convinced the home office is wrong, it is easy for you to graciously let this be known to your firm and they will admit the mistake and your customer will receive justice.

Don't Jump to Conclusions

About 9 times out of 10 salesmen are stampeded when they are suddenly confronted with trouble. They entirely lose their poise and the buyer can throw panic into their ranks by showing them that he has a justifiable complaint and that the manufacturer has wronged him. While you are neither judge nor jury, you must remember that the buyer does not settle cases either in court or out of court. There are two sides to every controversy and if you refuse to be stampeded the buyer will have to convince you that he has been wronged, and in his effort to convince you he will have to present facts and in the presentation of these facts you obtain information which is necessary to show to the home office that you are handling the complaint in a slow, logical, dignified way, and you are not getting in wrong with either party.

There is a great distinction between the order taker and the modern salesman. One belongs to the old school; he has a single track mind and a single track job. He goes in one direction for an order and when he secures it he backs up to the factory and delivers it, and out he goes again on a single track. He is almost as bad as a horse with blinkers; he cannot see anything around him, and if there was a sudden explosion to one side there is only one thing for these blind, single track men to do and that is run.

The modern, successful salesman—the man who reaches the top—has to have a lot of qualifications. He has to know where to sell his goods; he has to convince the buyer that they are wanted. He must realize that the buyer will want attention; that he will make complaints but that these have to be handled diplomatically.

Is Your Heart in Your Job?

As a director of salesmen, there are three things that I exact—loyalty, enthusiasm, reliability. "Is your heart in your job?" If it is not, don't spend another day in the position you have. You are wasting your time and you are wasting the time of the firm you represent. You are temporizing. You are forming the habit of compromising with yourself and you are on the road to failure.

"Are you cheating yourself?" This is one of the most dangerous things that can happen to a salesman. I mean, are you trying with the least amount of physical and mental effort to get by and earn your salary? While you may, under this condition, be cheating your company, they do not lose nearly so much as you do, because they have a large number of salesmen working for them and you are only a unit; but you are the whole thing to yourself and if you get into that mental attitude where you feel you are putting something over on the home house, let me tell you it is 10 per cent. you are putting over on the home house and 100 per cent. on yourself, and you are just losing about ten to one.

You will probably note that I have emphasized that one of the largest contributing elements to success in salesmanship is work. Now let us see how this applies to the success which stands out prominently in public life. We have as shining examples men like Lincoln, Roosevelt, Thomas Edison, and so you can go down the line. True, these men were gifted with a peculiar type of brains which classed them as geniuses, but I think that you will agree with me, if you know anything about the history of their early life, their struggles and even at the present time, these men were working from early morning to late at night; that nothing worth accomplishing was too much trouble; and they did not shirk their duty or care how many hours a day they put in at their tasks.

Now with the wonderful brains that they had they did not take advantage of their gifts to slide by with little work—they utilized the advantages of good brains and put into action the thoughts which came to them and consequently they were known as geniuses because they combined ability with work. Separating these advantages would have made them but ordinary men; together they made them men of renown. Now we cannot all be Lincolns, Roosevelts, Edisons, but we can all get further on our road to success if we will every day do an honest day's work.

The Truck Tire That Makes Lasting Friends

SUPERIOR Service can only mean Superior Quality that holds large fleet operators such as the Star Motor Delivery Co.

Because of their exceptional wear-resisting quality it is inevitable that Polack Truck Tires should continue to give *year after year satisfaction.*

Years of specialization with one product—the pioneer of all Truck Tires—have established Quality in Polack Truck Tires on a certain scientific basis that assures Truck Users fine service as consistent as it is exceptional.

Dealers can take advantage of the attractive money-making opportunity in selling Polack Truck Tires to the best class of truck users.

The superior performance of Polack Truck Tires in all lines of business assures Dealers a constantly-growing volume and the lasting good-will of their customers.

With a product that is right, a price that is right, and an adjustment basis that is an established fact, not an innovation, the Polack Dealer proposition undoubtedly offers an attractive money-making opportunity.

POLACK TRUCK TIRES

SINCE 1899 WORLD'S STANDARD

—*complete in both Regular type and High Crown type.*
—enable Dealers to dominate the best and most profitable truck-user business in their territory not only the first year, but every year.

Write for full details of Polack Dealer Proposition in open territory

POLACK TYRE & RUBBER CO.
1876 BROADWAY, -- NEW YORK.

S. A. E. Engineers Guests of Goodyear Plant

Detroit and Cleveland Sections Investigate Truck Pneumatics. Demonstrate Six-Wheeled Pneumatic-Tired Truck

By E. S. FOLJAMBE

THE future of highway transportation and the part that may be played in this important activity by six wheeled trucks and pneumatic tires were subjects of discussion on December 1st and 2d at the Goodyear Tire & Rubber Company's factory at Akron, Ohio. Here were assembled a notable group of automotive engineers, members of the Cleveland and Detroit Sections, who were royally entertained by the big tire company during their two days' stay.

The joint session met in the new gymnasium of the Goodyear recreation building, where was staged a most complete exhibit of pneumatic equipment from the 5 in. up to the giant 12 in. sizes. Meals were served in the lunch room and a banquet on Monday evening at which President F. A. Seiberling of the Goodyear Co., P. W. Litchfield, vice-president and several others outlined their ideas as to the future possibilities of pneumatic tired trucks. Both of these men believe thoroughly in the future of pneumatics. They predict that in a very few years not only will the solid tire for trucks be almost obsolete but their vision of the future includes the forcing from our congested streets all electric street cars with their tracks and intermittent holding up of the traffic. The electrics will be used underground for long distance rapid transit passengers and motor buses on pneumatics on the surface will handle the passenger traffic in the crowded districts.

The S. A. E. members enjoyed a thorough inspection of the processes of manufacture of the truck pneumatics and were also offered a balloon ride, four of the members of the Detroit Section, George A. Breeze, H. W. Hancock, J. E. Schipper and N. S. Reed, being drawn to go

The professional sessions were held in Goodyear Hall and papers by Goodyear men, dealing with pneumatic tires for trucks, were read and discussed. A large number of tables compiled from actual experiences were included. These papers give the most complete resume of the subject that has yet been given out and are, therefore, reproduced almost in their entirety in the following pages.

It was exident that the Goodyear people desired very much the real criticism of the engineers of both their attitude to the future of the pneumatic for truck use and also the six wheeled vehicle which for a year or more they have been experimenting upon and developing. The discussion of the papers and this truck brought out more or less favorable comments and very little adverse criticism on the part of the best known engineers in the country. There seemed to be a consensus of opinion that the big future development of highways transportation required pneumatic tires and that if an application of six wheels to a truck permitted the use of 8 instead of 12 in. tires under a 5-ton load it was an advantage. The writer will personally say that the traction, riding qualities, speed and braking ability of this 5-ton Packard truck with 3-ton frame and six wheels worm driven, were no less than phenomenal. The truck loaded with cement and ten or fifteen men was driven over paved streets and country roads. Even with cement bags for seats it rode like a touring car and when the four 21-in. brakes were applied, as suddenly as possible, stopped more quickly than a touring car. A pint milk jar of oil filled within an inch of the top and placed over the rear axles did not spill a drop during the trip.

Why the Use of Pneumatic Tires for Motor Trucks?

By W. E. SHIVELY

EVERY development in the transportation industry has been towards a faster, more reliable, or cheaper method of transporting men and materials. No one will deny that the motor truck was a very significant development in the transportation system of the world. This was conclusively proven in the World War. And most of us here, I believe, are of the opinion that the motor truck is destined to become the most important factor of our transportation system.

At first, solid tires were used on all but light delivery trucks. On every other type of motor vehicle, the limitations of the solid tire were soon discovered, and were replaced by pneumatics. But the tire manufacturers had not kept pace with the development of the motor truck, inasmuch as they had not perfected a large enough pneumatic tire. Solids had to be used.

Tire engineers, however, were among the first to recognize the shortcomings, and proceeded to develop a large single pneumatic tire for motor truck use.

Most of you, I believe, are sold on the pneumatic tire principle for motor trucks, but are you convinced that they are practical and economical? To prove that they are, is the purpose of this paper.

Now if it is possible to use pneumatic tires on passenger cars to such advantage, it is reasonable to assume that certain advantages will result from their use on motor trucks, and the actual experience of many users has proven this to be true.

It has been found that there are two fundamental advantages which result from their use on trucks:

(1) Increased Cushioning.
(2) Increased Traction.

The increased cushioning is the most important factor, because it has a greater effect on the performance of the truck. Mr. Templin, in his paper, will prove to you that the cushioning ability of a pneumatic tire is four times as great as that of a solid tire of the same carrying capacity. Until then, I am asking you to take my word for that. As a result of this greatly increased cushioning, there are six distinct advantages gained from the use of pneumatic truck tires:

(1) Faster Transportation..
(2) Economy of Operation.
(3) Less Depreciation of Fragile Load.
(4) Easier Riding.
(5) Less Depreciation of Roads.
(6) Lighter Weight Trucks.

Each of these six points will now be discussed separately and wherever possible actual data will be presented to substantiate the claims made. These figures have been obtained from truck operators, each of whom have taken two trucks of the same make and capacity, one equipped with pneumatic tires, the other with solid tires, and operated them under exactly similar conditions; that is, over the same roads and carrying the same loads. This data can be verified.

Faster transportation or quicker deliveries result from the increased cushioning of pneumatic truck tires. Operators have found this to be true, because it is possible to obtain greater maximum and minimum speeds. Manufacturers of solid tire trucks remove their guarantee if a speed of 11 or 12 miles per hour is exceeded, while pneumatic tire trucks are being operated at 20 to 35 miles per hour. But in ordinary city or farm hauling we are more interested in a greater minimum speed than we are in a greater maximum. That is, in running over rough city streets or country roads, a solid tire truck must operate at slow speeds, because of the shock and vibration.

It is therefore evident that if a truck on pneumatic tires will make more or longer deliveries in a given number of hours, its radius of operation is increased and also its earning power. The following table will show the increased mileage

obtained with pneumatics by four truck operators:

Operator	Truck Capacity	Period	Mileage on Pneumatic Tires	Mileage on Solid Tires
A	2 ton	6 mos.	6414	4476
B	3½ ton	1 mo.	1995	675
C	2 ton	5 mos.	5510	2223
D	2 ton	4 mos.	7014	4677

The economy of operating trucks on pneumatic tires has been shown by the experience of many users. There is a considerable saving in gasoline, oil, and upkeep. Furthermore, depreciation charges can be reduced considerably.

The saving in gasoline is due to a lower power consumption resulting from the increased cushioning obtained. It is a well known fact that vibration in a machine of any kind results in a loss of power. The vibration caused by the solid tires is practically eliminated by the use of pneumatics. You will remember that I made a statement to the effect that a pneumatic tire possessed four times the cushioning ability of a solid tire. Now a solid tire, in rolling over an obstruction in the road, lifts the entire load on the tire four times as high as it would be lifted in the case of a pneumatic tire. Many roads are full of little obstructions, so that a certain amount of power is lost in lifting the load of the truck over them. The relative cushioning ability of the two types of tires seems to indicate that the power loss from this cause is four times as much for solid tires as for pneumatics. Then there is a saving in power in climbing hills. Because it is possible on pneumatic tires to approach a grade at a much higher rate of speed, less power will be consumed in climbing the grade; it will not be necessary to shift gears as soon, and possibly not at all. The saving in gasoline in the case of five truck operators is shown in following table:

Operator	Truck Capacity	Period	Miles per Gal. on Pneumatic Tires	Miles per Gal. on Solid Tires
A	2 ton	6 mos.	5.77	3.98
B	3½ ton	1 mo.	5.75	4.77
C	2 ton	5 mos.	7.21	5.43
D	2 ton	4 mos.	7.7	7.1
E	2 ton	9 mos.	9.1	6.1

The saving in oil is probably due to the decreased vibration in all of the moving parts of the truck. The statistics from four truck operators show that there is a considerable saving in oil consumption:

Operator	Truck Capacity	Period	Miles per Gal. on Pneumatic Tires	Miles per Gal. on Solid Tires
A	2 ton	6 mos.	104.0	59.0
B	3½ ton	1 mo.	32.0	30.7
C	2 ton	5 mos.	55.0	54.0
D	2 ton	4 mos.	152.0	78.0

Less Upkeep Cost

The upkeep or repair cost of a truck operated on pneumatic tires is much less than when operated on solids. The experience of a large number of truck operators has shown this to be true. This can be attributed to the decreased amount of vibration and the absence of severe shocks and jolts. It is found that parts do not have to be replaced, and that the truck does not have to be overhauled so often. Information pertaining to the upkeep cost of the trucks from which we have taken the other data in this paper cannot be considered reliable, inasmuch as the records do not cover a sufficient period. Reliable information cannot be obtained in less than one year. The estimated saving in upkeep cost is from 25 to 50 per cent.

Then there is the subject of depreciation charges. As a result of Goodyear's experience, its own solid tired trucks are depreciated on the basis of 60,000 miles of service, while the pneumatic tired trucks are depreciated on a basis of 80,000 miles. In my opinion the 80,000 miles is too low, because there have been Goodyear trucks on pneumatic tires which at the end of 250,000 miles were still in good running condition, and I do believe that in the near future they will be depreciated on the basis of 100,000 miles.

Costs Per Mile Compared

Now, taking all of these cost factors into consideration, it is found that the cost per mile of operating trucks on pneumatic tires is considerably less than that on solid tires. Referring again to the data obtained from truck operators who have kept accurate records, this claim is substantiated:

Operator	Truck Capacity	Period	Cost per Mile on Pneumatic Tires	Cost per Mile on Solid Tires
A	2 ton	6 mos.	45.0	56.3
B	3½ ton	1 mo.	31.3	55.0
C	2 ton	5 mos.	21.5	24.0
D	2 ton	4 mos.	27.7	31.0

Less Load Breakage

Now let us consider the lessened depreciation of fragile loads resulting from the increased cushioning ability of pneumatic truck tires. This is now considered by many users of these tires to be one of the most important advantages. While actual data cannot be submitted to substantiate this point, many truck operators engaged in different classes of service have found this to be true. For instance, in hauling fragile materials such as bottled goods and eggs, there is very little, if any, breakage. The farmer experiences very little depreciation in the live stock and produce which he hauls to the markets. Manufacturers have found that many of their products could be shipped without being cased.

Then there is the easier riding made possible by the use of pneumatic tires. In the case of delivery trucks, the elimination of the vibration makes it possible for the truck driver and his helper to ride almost continually without fatigue. This is of vital importance in long distance hauling, where it is necessary to drive for hours at a time. Easy riding is absolutely essential in passenger busses, both from the standpoint of comfort and of speed. If the busses do not ride comfortably, the public will not patronize them, and, of course, speed is very desirable in passenger service.

Less Destructive to Roads

The question of good roads is now a very important one. Before the motor truck can be utilized to the full extent of its possibilities, good roads are essential. However, along with the legislation providing these, laws are being considered and in some instances passed restricting motor truck traffic. Now a pneumatic tired truck has very little more harmful effect on an improved road than a passenger car. This is not true of a solid tired truck. Because of the vibration and sharp jolts common to solid tires, any road will eventually break down under such traffic. The effect on dirt roads is the most harmful. The narrow, hard tread of the solid tire will soon cut into the road, whereas the soft, wide tread of a pneumatic tire will not. Attempts have even been made to prohibit solid tired trucks from using certain roads, and on some of the principal thoroughfares of our cities this has already been done. In such cases pneumatic truck tires have a distinct advantage.

Because of the almost total absence of vibration and severe shocks on pneumatic tires, it will be possible to make many of the parts of the truck lighter in weight, thereby decreasing the initial cost of the truck and increasing the pay load, which means again, greater earning power.

Increased Traction

Increased traction is made possible by the greater width of the pneumatic tires, their non-skid treads, and their greater flexibility which allows the surface of the tire to conform more nearly to the unevenness of the road, thereby getting a better grip.

Now, as a result of this increased traction, we obtain reliability and safety. By reliability we mean that it is possible for the truck to operate successfully over almost any kind or condition of road, and during all seasons of the year. Truck operators have found that they can use their pneumatic tired trucks in many ways in which a solid tired truck could not be used, and instead of laying them up during the winter months could use them continually without becoming stalled in mud or snow.

By safety, it is meant that because of the increased traction of the tires, the truck will hold the road better and the brakes will be more effective. This point has been thoroughly proven by the experience of many users of pneumatic truck tires and Goodyear's Akron-to-Boston trucks. In traveling over the mountains along the Lincoln Highway, during the winter months, this increased traction has, on numerous occasions, saved both drivers and trucks from serious accidents.

Arguments Against Pneumatics

All of the arguments against the use of pneumatic tires on trucks can be placed under either of the following:

(1) Cost.

(2) Practicability.

The matter of cost can be sub-divided into two parts; initial cost, and the possible loss due to injury and abuse. While it is true that the initial cost of pneumatic truck tire equipment is greater than that of solid tire equipment, it has been proven by the experience of many truck operators that this difference is more than offset by the greater earning power and the lower cost of operation. It has usually been found that in four to six months time, the increased cost of the pneumatic tire equipment is completely wiped out. Now when the time comes

that these specially designed pneumatic tire trucks make their appearance, this increased cost of pneumatic tire equipment will be offset by the lower initial cost of the truck itself. There are, of course, many instances where the question of tire cost is secondary to that of speed, or easy riding.

As to possible loss due to injury or abuse of the tires, it has been found that this is not a serious objection. There are innumerable instances where pneumatic truck tires have run from 12,000 to 20,000 miles on the original air. As the development of the tires themselves has progressed, so has the successful repairing of the tires been worked out. Repair molds and retreading equipment are now in use in many parts of the country, and are being placed in other localities as rapidly as possible, so that it will be no more difficult to have a pneumatic truck tire repaired than any other part of the truck.

Tire Changing

The practicability of pneumatic truck tires has been questioned probably more than anything else. The first thing to be discussed under this subject is that of delays due to changing tires. The amount of time necessary to change a tire depends upon the type of rim equipment. In the case of detachable rims, where it is necessary to remove the tire from the rim, replace it, and then inflate it, it does not take more than thirty minutes to perform the entire operation. In the case of a demountable rim, a change can easily be made in fifteen minutes. I am not trying to argue the relative merits of the two different types of rims, but is an occasional delay of from fifteen to thirty minutes to be considered when you know that you can save hours, not minutes, every day that the truck is in operation, when it is equipped with pneumatic tires. The average truck driver is not required to make a tire change more than once in three months.

It is often said that it is not possible to maintain the high inflation pressures required for pneumatic truck tires. Very little difficulty has been experienced in this respect. Now most garages and service stations carry sufficient air pressure to inflate tires up to the 42 x 9 in. size, and many can take care of the larger sizes. By the time the largest tires are in general use, there will be sufficient air pressure to keep the tires properly inflated. Trucks equipped with detachable rims, or operating in long distance or inter-city service, are usually equipped with small air compressors. The trucks experience no difficulty in securing sufficient pressure.

Danger From Pressure Slight

One objection which is not mentioned so much now as when pneumatic truck tires first made their appearance, is the danger of the high inflation pressures carried in these tires. Pneumatic truck tires are made to withstand three to four times the pressure carried in them, so that we must "pass the buck" to the rims. Now the same is true of the rim as the tire; it is made to hold many times the pressure carried in the tires. So that if the rim is properly assembled, there is no possible chance of accident While it is true that there has been a few accidents from this cause, they are usually the result of carelessness.

While discussing inflation pressure it might be well also to mention the rise in pressure caused by the heating up of the tire. We have operated these big tires under the most severe conditions possible, and in no case have we found an increase in pressure of more than 35 pounds. If the tires are made to withstand three and four times the pressure at which they are operated, it is hardly possible that this additional 35 pounds pressure will cause them to blow out.

The large outside diameters of the tires are often objected to, because they affect the truck ability and because they raise the center of gravity of the truck. In changing over a solid tired truck to pneumatics, there is the possibility of reducing the ability of the truck. Our experience has shown that unless the truck is operated over a very hilly route, that the ability of the truck has not been noticeably affected. There have been too many successful change-overs to allow this to become a serious objection. Looking into the future a little, this question of truck ability and gear ratios will be taken care of by changes in design. So the question of change-overs is only temporary.

Raising the center of gravity of the truck is not as serious as it might seem. The question of getting the load into the truck has not been a serious question at all. I do not believe that the loading platforms are of such a uniform height that a little change in the height of the truck platform would make a great difference. This question is also only temporary, is it not? Isn't it possible to adjust this height in the re-designing of the truck?

When a Tire Goes Flat

We have heard it said at different times that in case of a large rear tire suddenly going flat, the sudden drop of the truck might turn it over on a crowned road. When a big tire goes flat, it does not go suddenly. The blowout or cut in the tire is never very large, so that it takes some time for the air to escape. Therefore, the truck does not tip suddenly. Furthermore, when all of the air is out of the largest tire now made, a 48 x 12 in., there will be a drop of only 5 in. Now assume that the tread of the rear wheels is 66 in., the list of the truck would be approximately 4½ degrees, which is not enough to cause the truck to turn over.

I wish to state that the object of this paper has not been to tell you what somebody thinks about the usefulness of the pneumatic truck tire, but rather to tell you what the actual experience of thousands of users of these tires have found to be true.

Data on Pneumatic Tires and Rims as Used on Trucks

By BURGESS DARROW

THE object of this paper is to familiarize truck engineers, and others interested in truck design, with facts and opinions which will help in getting the correct pneumatic tire and rim equipment on their trucks.

I want to make a preliminary statement regarding the sizes which have been worked out during the past six years and which are now standard. Beginning with tires as small as 5-inch the standard sizes are as follows:

Standard Truck Pneumatics

34 x 5	42 x 9
36 x 6	44 x 10
38 x 7	48 x 12
40 x 8	

The youngest member in this group of sizes is the 34 x 5 which is a new size this year and as a matter of fact is not yet standardized, but it is the connecting link between the smaller sizes, commonly called passenger car sizes, and the larger, and gives us a group of sizes ranging from 5-inch to 12-inch, and by selecting the overall diameters that we have, each one fits a 24-inch diameter wheel.

The point of having all tires with a 24-inch wheel diameter is that we have the minimum number of tires, that is, one only of each cross section diameter, and therefore, given any rim there is a regular tire for the rim, and if unusual conditions come up in the field demanding a larger tire, the next size larger tire, since they all fit 24-inch rims, can be used on the rim in question as an oversize to give extra carrying capacity or wear.

Getting down to the minimum number of sizes by having one size only of each cross section, is of benefit to the tire manufacturer, the truck manufacturer, wheel manufacturer, truck dealer, tire dealer and consumer and needs no explanation.

Rim Sizes	Normal Tire for Rim Original Equipment on New Trucks	Oversize Tire for Rim Only for Convenience of Consumer and not for Original Equipment
34 x 5	34 x 5	36 x 6
36 x 6	36 x 6	38 x 7
38 x 7	38 x 7	40 x 8
40 x 8	40 x 8	42 x 9
40 x 8	42 x 9	
44 x 10	44 x 10	
48 x 12	48 x 12	

You will notice from the table that there is no oversize possibility when 9 in., 10 in. and 12 in. go out on new

trucks, because the oversizing plan falls down above the 9 in. on account of the size and stiffness we are forced to build into the beads as designed at present.

If oversizing has often proved a saving to the users of passenger cars it is obvious that instances of the necessity of oversizing on trucks will be much more common due to the greater range of loads the truck will be called upon to carry, and the variety of uses the trucks will be put to.

No new trucks should go out into service with the oversize combination of rim and tire already on them, thus depriving the user of his right to go one better in the way of tire size, if his conditions warrant it.

Load and Inflations

I would like to discuss this to considerable length, but can only touch on it briefly, and tell you something about what pneumatic tires can stand in the way of flexing, in order that you may understand the table of loads and inflations.

To the best of our knowledge tires give best average satisfaction in use with not too much flexing, which is what breaks down a tire, when run under conditions which produce a deflection in the tire of from 12 to 15 per cent. of the section diameter, that is, 12 to 15 per cent. of the height above the rim. The deflection can be controlled by regulating the load or regulating the pressure or both.

Maximum Load and Inflation

Tire Size	Extreme Maximum Allowable Load Per Tire	Inflation Pressure
34 x 5.....	1700	80
36 x 6.....	2200	90
38 x 7.....	3000	100
40 x 8.....	4000	110
42 x 9.....	5000	120
44 x 10.....	6000	130
48 x 12.....	8500*	140

* Not standard yet with S. A. E.

I want to take this opportunity to say a word about under-inflation and overload. Both evils result in an excessive deflection of the tire, which means an excessive shearing action is put on the rubber between the plies of the tire, and also on the cushion built into the tire between the tread and the plies, which in turn results in a separation of the parts and the tire is on the road to failure.

No truck driver would start out a day without attending to the water in his radiator, or the oil in his motor, because neglect of either one would damage the motor and I want to point out that exactly the same daily attention must be given to tires in the way of inflation and avoidance of overload.

The next thing is to show how the loads we recommend for the tires are adapted to the various sizes of trucks. The Tire and Rim Committee of the S. A. E. investigated this and their findings appear in the June 23, 1919, Report of Divisions of Standards Committee, page 24.

The weights of practically all makes of trucks were ascertained and plotted,

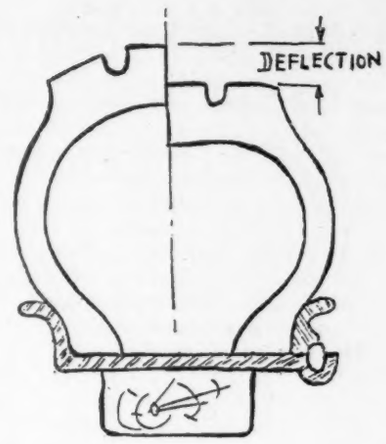


FIGURE I

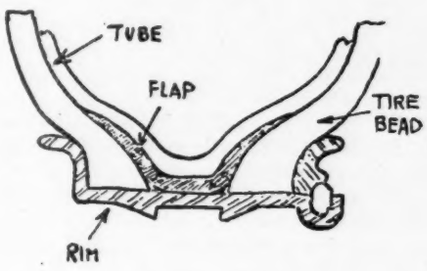


FIGURE IV

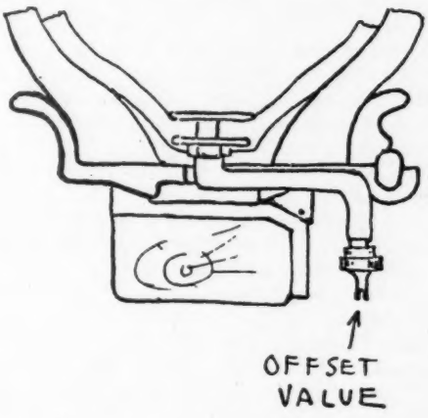
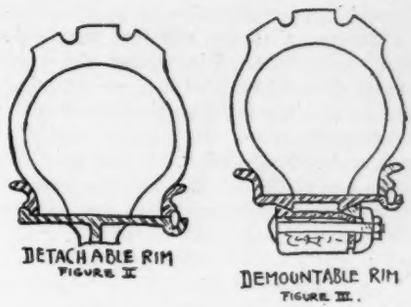


FIGURE VIII

and it was found that all trucks of a given capacity weighed nearly the same when under full load, and it was possible to specify what the pneumatic tire equipment should be on any truck of certain carrying capacity. The bodies on all the trucks in question were assumed to be standard stake bodies, and of course heavy bodies might in some cases necessitate a revision of the committee's findings. The following table is the original table with a little alteration in the tire equipment for front wheels on trucks of 1½-ton and under:

Size Truck	Front Maximum Weight per Wheel	Front Pneum. Tire Size	Rear Maximum Weight per Wheel	Rear Pneum. Tire Size
¾ ton	800	4, 4½ or 5	1600	34 x 5
1 ton	1000	4½ or 5	2100	36 x 6
1½ ton	1200	4½ or 5	3000	38 x 7
2 ton	1500	34 x 5	3500	40 x 8
2½ ton	1800	36 x 6	4000	40 x 8
3 ton	2000	36 x 6	5200	44 x 10
3½ ton	2100	36 x 6	5700	44 x 10
4 ton	2300	38 x 7	6500	48 x 12
5 ton	2700	38 x 7	7800	48 x 12



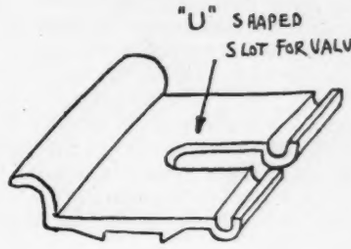


FIGURE VII

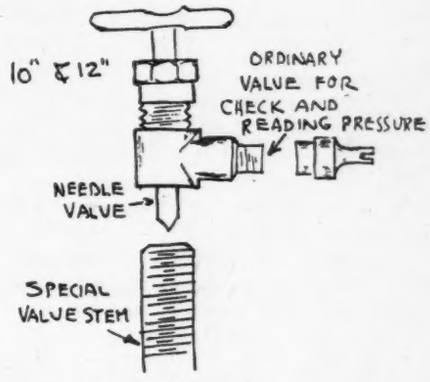


FIGURE VI

Check up any make of truck fully loaded to its rated capacity and you will be surprised to see how close the weights on the tires come to the figures in the table.

Rims and Wheels

There are now in satisfactory service wood wheels, cast steel wheels of eight or ten designs and disc wheels. On all of these, can be mounted rims of either the so-called demountable type—by that I mean a rim on which is carried a ready inflated tire—or the so-called detachable rim, which is perhaps a misnomer, because the rim is not detachable but the tire is removed by detaching a side ring from the rim and spare tires cannot be carried ready inflated.

The arguments for the demountable are the inflated spare tire and the time required for a tire change. The arguments against the demountable are the extra weight required, the extra cost, and the possibility of mechanical troubles. The detachable rim arguments are the exact opposite; in favor of the detachable are the arguments of less weight, less cost and greater freedom from mechanical troubles and against the detachable are the arguments of time required for a tire change and means of inflating the tire after it is changed.

Speaking for the Goodyear Company, I shall say that we will not take sides with either type. We submit the arguments, state that both types are practical, that we are in a position to furnish either to the trade, but believe truck engineers must make the decision. Is the user forfeiting anything worth while in demanding a demountable, with the convenience of an inflated spare, which will naturally be his first choice?

I do not care to discuss the wheels in detail, but the trucks on demonstration give a good idea of the variety with which Goodyear has experimented.

I shall, however, read some tables to give an idea of weights of the various tire, wheel and rim equipment. The weights are some which we recently took of equipment in service in the Goodyear Garage at Akron. They are neither the heaviest nor the lightest wheels we have, but represent what to expect as wheels are built today.

Weights of Tires alone without Wheels or Rims but including Tubes and Flap:

6 in.	72 lb.	9 in.	174 lb.
7 in.	87 lb.	10 in.	246 lb.
8 in.	119 lb.	12 in.	398 lb.

Weights of Demountable Rims Complete with Rim Base, Rim Side Rings, Bolts and Clips, but not Wheel or Felloe Band:

6 in.	66 lb.	8 in.	101 lb.
7 in.	75 lb.	10 in.	132 lb.

Weights of Wood Wheels, Detachable Rim Type, Including Rim, Rim Side Rings and Hub, and in case of Rear Wheels, the Brake Drum:

6 in. Front	lb.	7 in. Rear.	166 lb.
6 in. Rear.	lb.	8 in. Front	168 lb.
7 in. Front	123 lb.	8 in. Rear.	223 lb.

Weights of Steel Wheels, Detachable Rim Type, Including Rim Parts, Hub and in case of Rear Wheels, the Brake Drum:

6 in. Front	141 lb.	8 in. Front	lb.
6 in. Rear.	lb.	8 in. Rear.	254 lb.
7 in. Front	130 lb.	10 in. Rear.	235 lb.
7 in. Rear.	lb.	12 in.	255 lb.

Weights of Wood Wheels, Demountable Type, Including Felloe Band, Hub and in case of Rear Wheels, Brake Drum, but Other Rim Parts than Felloe Band not included:

6 in. Front	116 lb.	7 in. Rear.	169 lb.
6 in. Rear.	lb.	8 in. Front	lb.
7 in. Front	lb.	8 in. Rear.	170 lb.

The tables just given will enable one to calculate various combinations of weights approximately.

Tubes, Flaps and Valves

Tubes for pneumatic truck tires must be designed and compounded so as to retain as much of their original strength and shape as possible, after being subjected in service to more or less heat and to continued flexing. The tube has been one of the most difficult problems in connection with the big tires, but has been solved partly in a mechanical way by building the tubes thick, building them shaped like the tire, and building them so they are stretched very little in the tire, and solved to a still greater extent by means of rubber compounding. I only wish to point out that the tubes are on a par with the casings in development and render satisfactory service even up to the largest tires.

Flaps assume considerable importance in tires inflated to pressures we recommend for truck tires. It is important that the flap fit well so there will be no adjustment of the flap when the tire is inflated, causing localized stretch in the tube at the edge of the flap.

The valve question had to be approached from two angles; first, from the standpoint of holding air at pressures from 90 to 140 lb. and second, from the standpoint of ease of tire change.

The valve insides on all tubes 6 in. and larger is of a heavy duty type different from the ordinary valve insides in construction but the two are interchangeable in any valve stem.

On the 10 in. and 12 in. which inflate to 130 and 140 pounds respectively, even the heavy duty type is unsatisfactory when used alone and a combination is used in the form of a heavy duty valve inside and a needle valve operated by a hand screw.

Valves and Tire Changes

Now as to relation of the valve to easy tire changing. It is customary in applying the small size tires to insert the valve in the hole in the rim and tip the tire on the rim. This necessitates considerable clearance in diameter of the tire beads over the rim and in sizes 7 in. and above such design is impractical because the rims are wide and would necessitate too much clearance in bead diameter. It is therefore necessary if a straight valve and the usual valve hole is used, to push the valve up into the tire, fit the tire on the rim and then fish the valve through the valve hole, which sounds very difficult, but is not.

To avoid even this difficulty some steel wheels are made with a "U" shaped slot from the edge to the center of the rim, which permits the tire to go on the rim with no difficulty at the valve. We have approved wheels slotted this way after having tested them, but believe another scheme, that is of an offset valve,—by that I mean a valve with two right angle bends in it—will eventually be used. The offset valve requires only a depression in the rim from the edge to the center and not a slot. The wheel is stronger than if slotted and besides making application just as easy, the valve comes out at the edge of the rim and is easier to get at to inflate.

I have touched on valves briefly but hope you all have a chance to take notice of the valve equipments I have mentioned when looking at wheels displayed.

I have one more important item which I want to discuss, and that is, the arrangement of tires on the trucks.

There are three possibilities—first, the ordinary truck with giant tires on four wheels; second, dual pneumatics on the rear; and third, trucks with six or more wheels like one of our demonstrators.

Disadvantages of Dual Arrangement

We are primarily interested in carrying trucks on pneumatic tires so we have tried the three possibilities and as a result we look unfavorably, only on the dual pneumatics, that is, two tires on the same wheel. I admit we tried the dual idea and abandoned it several years ago, but it crops up now and then and I want to set our reasons clearly before you for dropping it.

The dual tires do not share the load equally because the inflation is seldom kept alike in both tires, and because of crowned roads and more particularly rough roads, one tire takes more than its share of the load temporarily, and this will injure the tire.

An exaggeration of this condition is when one tire goes flat and the other tire takes all the load without the knowledge of the driver, and the tire which still holds air is so badly overloaded it is sure to be injured, if not ruined.

Changing an inside tire, in the case of duals, necessitates removing both tires.

One argument advanced for duals is that if one tire goes flat the truck can continue, but I know it cannot continue far. Another argument is that one size tire only need be carried for a spare, but this is unimportant.

All these arguments can be summed up by saying that dual tires are too easily abused and prove more expensive than either of the other two possibilities.

Pneumatic Tires Revolutionize Chassis Construction

In experiments recently conducted by The Goodyear Tire & Rubber Co., Akron, Ohio, which operates a fleet of 50 trucks in the transportation of freight and passengers, complete truck weight has been cut to 8000 lb., permitting a record pay-load of 7000 lb. The truck in question is composed of a two-ton chassis, a three-ton motor and 38 x 7 and 42 x 9 tires.

This remarkable development of truck transportation has already proved to the company that it can haul its own products from the factory to branch offices at a saving in freight rates.

Heretofore it was supposed that pneumatics would not make any material difference in truck construction, nor was it supposed that any heavy type of truck could be equipped with less than 44 x 10 tires on the rear wheels. But the company kept close check on the performance of trucks and tires even to the extent of sending several of its express trucks on coast to coast trips.

A truck weighing 15,800 lb., carrying a pay-load of only 3850 lb., was stripped to 11,800 lb. and developed a pay-load of 5800. It was still considered too heavy in proportion to the load carried. A further reduction resulted in a 10,000 lb. truck with a pay-load capacity of 6800 lb. This was followed with the 8000 lb. truck now carrying a load of 7000 lb.

What Needs to be Done to the Truck to Have It Match Pneumatic Tire Equipment

By E. W. TEMPLIN

WE came to realize sometime ago that the introduction of the Pneumatic Tire for motor trucks would have a material bearing upon the design of the trucks itself, in order to get the most good from the use of such a tire. For this reason, we have been making a study of the problem from this point of view and have at this time certain considerations to present to you.

One might say that it is about as ridiculous from the standpoint of balanced design to place pneumatic tires on a vehicle designed for solid tires as it would be to equip a passenger car with solid tires.

The main factors bearing upon the problem of truck design for pneumatic tires are as follows:

Speed

Road Speed
Engine Speed
Rear Axle Gear Reduction
Brakes (air).

Traction

Engine Torque
Transmission Gear Reductions

Shock Effects

Stresses introduced
Necessary Factor of Safety, Unsprung Parts
Necessary Factor of Safety, Sprung Parts

Emergency Equipment

Tire Pumps
Spare Tires

It will be noted here that a normal speed of 25 m.p.h. is required to double the average speed of a solid tired truck whose normal or governed speed is 11 m.p.h. The answer of course is that the solid tired truck has a higher tractive ability in high gear and hence is able to maintain its normal speed over a great many grades.

Fig. 3 shows how time can be conserved by a careful study of gear reductions.

it is necessary to equip them with brakes having 100 per cent. more capacity than is the case with solid tired trucks. This brings up the question of how to apply such a capacity easily. In answer to this, we would suggest the application of brakes to the front wheels when all the capacity possible is attained in the rear. Front wheel brakes are now well worked out, due to the use of trailers during the war which required brakes on steering axles.

Traction

Once we have the normal speed determined we may next consider the tractive ability required to get over the road without the inconvenience of shifting gears too often. The tractive factors that we consider desirable and satisfactory are shown in Fig. 4.

The engine torque required to give these tractive factors is also shown together with the sizes of engines on the market today that develop the torque required. There are conditions however where larger engines may be desirable and we believe smaller engines will not give satisfactory speed.

Now that we have the high gear tractive ability and engine size determined, we have next the low gear ability to consider. We find a tendency toward a low gear ratio in the transmission of 6 to 1 in. five ton trucks. This in connec-

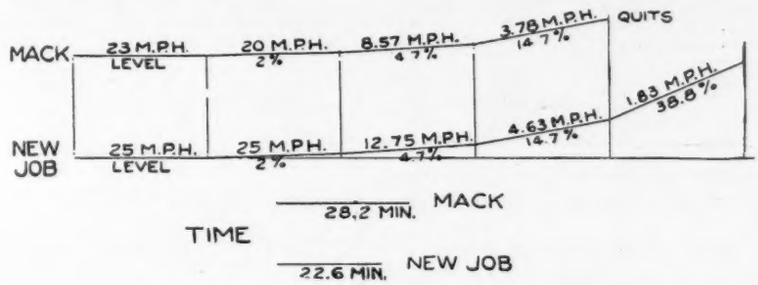


Fig. 3

Truck Capacity	Corresponding Pneu. Tire Tractive Factor	Corresponding Solid Tire Tractive Factor	Engine Torque Lb. Ins.	Engine Sizes on Market That Develop Approximate Torque Required		
1	.07	.085	1650	3¾ x 5	4 x 5	3¾ x 5⅛
1½	.06	.085	1950	4 x 5½	4⅛ x 5¼	4⅛ x 5½
2	.06	.083	2500	4½ x 6	4½ x 6¼	4½ x 5½
2½	.06	.082	3000	4¾ x 6	4½ x 6¼	
3½	.05	.077	3000	4¾ x 6	4½ x 6¼	
5	.04	.07	3200	5 x 6	4¾ x 5½ (6-cyl.)	
7	.04	.06	3300	5 x 6	4¾ x 5½ (6-cyl.)	

Fig. 4

Road Speed

Present Solid Tire Gear Ratios	Av. Gov. Speed	Pneumatic Capacity	Pneumatic Tire Speed	Tire Size	Rear Wheel R.P.M.	Drive R.P.M.	Pneu. Tire Rear Axle Gear Reduction
7- 8	17	1-1½	30	36"-38"	280 -265.4	1450	5.18-5.47
9-10	15	2-2½	30	40"-42"	252.1-240.1	1325	5.26-5.52
11-12	13	3½	25	38"-44"	221.1-191	1200	5.43-6.28
12-13	10-12	5	25	40"-48"	210.1-175	1200	5.72-6.86
14-16	9	7	20	42"-44"	160.1-152.8	1200	7.5 -7.85

Fig. 1

Fig. 1 shows road speeds that we consider satisfactory together with the usual rear tire specifications for various sizes of trucks. The engine speeds are figured on the basis of 1200 feet per minute piston speed which is a figure we believe may be considered a good average. However, some engines on the market may not operate successfully at this speed and again others can stand a higher speed. Higher speeds set up considerable vibration and add considerable discomfort to driving.

(Speeds on 40 mile Course.) Fig. 2 shows a little study in speeds over a given course which corresponds somewhat to the course from Akron to Cleveland, going by the way of Tallmadge in the one case, and by way of North Hill in the other.

Brakes

On account of the comparatively high speed of the pneumatic equipped trucks,

Speeds: Forty-Mile Course

Talmadge

	Solid Tire 1260 r.p.m.		New Job 1400 r.p.m.		6 Wheel 1600 r.p.m.		Mack 1400 r.p.m.	
	Speed	Time	Speed	Time	Speed	Time	Speed	Time
3 miles 6% grade	6.66	.45	8.57	.35	6.25	.48	8.15	.37
3 miles 3% grade	11.00	.27	17.90	.16	10.50	.29	14.10	.21
3¼ miles level	11.00	3.09	25.00	1.36	25.00	1.36	23.00	1.48
Total time	.....	3.81	.....	1.87	.....	2.13	.....	2.06
Average speed	10.50	....	21.40	....	18.70	....	19.40	....

North Hill

	Solid Tire 1260 r.p.m.		New Job 1400 r.p.m.		6 Wheel 1600 r.p.m.		Mack 1400 r.p.m.	
	Speed	Time	Speed	Time	Speed	Time	Speed	Time
1 mile 12% grade	3.52	.28	4.63	.22	3.47	.29	3.78	.26
2 miles 6% grade	6.66	.30	8.57	.23	6.25	.32	8.15	.25
3 miles 3% grade	11.00	.27	17.90	.16	10.50	.29	14.10	.22
3¼ miles level	11.00	3.09	25.00	1.36	25.00	1.36	23.00	1.48
Total time	.....	3.94	.....	1.97	.....	2.26	.....	2.21
Average speed	10.10	....	20.30	....	17.70	....	18.10	....

Fig. 2

tion with present solid tire axle ratios gives a tractor factor of .42. A desirable low-gear ability for trucks equipped with pneumatic tires may be given as .50 although we do not feel that it should be less than .30.

Transmission Low-Gear Reductions

Fig. 5 shows the low gear transmission ratios necessary to give these tractive factors. It will be observed that these ratios are considerably different from present practice and the question naturally arises—how can this best be handled.

Fig. 6 shows a conventional design of transmission to give about 14 to 1 reduction in low gear. Superimposed upon this is a regular transmission of about 5 to 1 low gear reduction in general use today. From this, it is evident that this construction cannot well be considered. The next best and easiest arrangement is as shown on Fig. 7 where we have a three speed unit transmission of regular design in combination with an auxiliary transmission having 3½ to 1 reduction and in combination with the 4 to 1 low gear reduction in the unit set we get 14 to 1 total transmission low gear reduction.

Fig. 5. Transmission Low-Gear Reduction

Truck Capacity	Low Gear Tractive Factor	Engine Torque	Total Gear Reducti	Rear Axle Reduction	Transmission Reduction in Low Gear	Trans-Dedn. .30 Tractive Factor
1 ton	.50	1650	49.1on			
1½ ton	.50	1950	51.0	5.18	9.47	5.68
2 ton	.50	2500	49.5	5.47	9.32	5.58
2½ ton	.50	3000	51.7	5.52	9.37	5.62
5 ton	.50	3200	79.7	5.43	11.3	6.77
3½ ton	.50	3000	61.4	5.72	14	8.4
7 ton	.50	3300	105	7.5	14	8.4

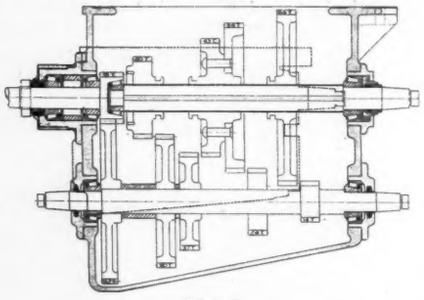


Fig. 6

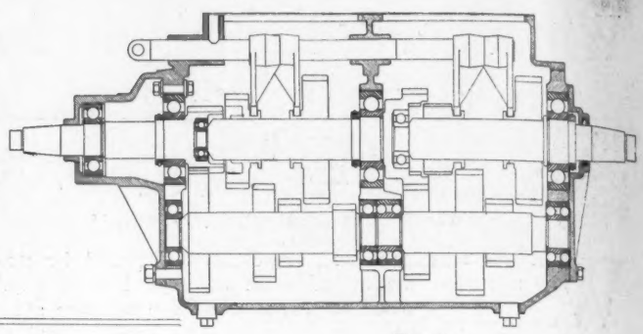


Fig. 8

Fig. 8 shows a more compact gear set system that involves the combination of the two sets above referred to into one.

Shock Effect

We may take up next the consideration of allowable stresses. Any fixing of allowable stress requires an investigation of the cushioning effect of pneumatic tires as compared with solid tires.

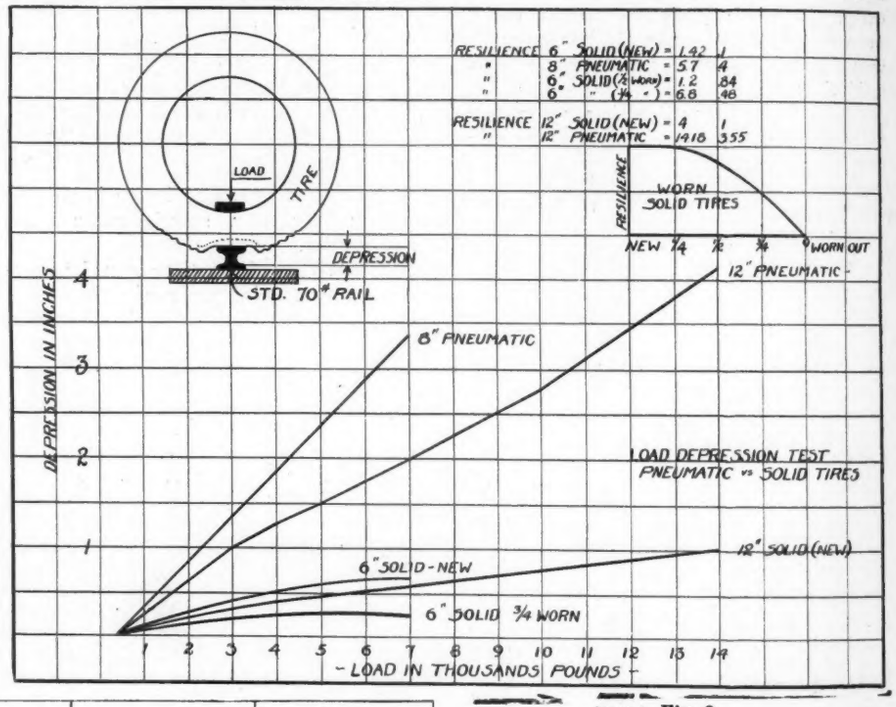


Fig. 9

Fig. 9 shows the rate of deflection of pneumatic tires and their corresponding solid tires, together with a curve showing how the solid tire depreciates in resilience with age and wear. It will be seen here that for a given load the pneumatic tire deflects four times as much as a solid tire.

On this basis, Fig. 10 will indicate that the stresses in unsprung parts due to shock build up to the same amount whether pneumatics are used or solids. There is, however, a difference in the time element, that is, the time required to build up the stress due to shock is in the case of pneumatics, twice that of the solids.

If any shading of the factor of safety is done, it seems that it is to be done on this basis.

As yet we have been unable to conceive of a method of testing or experimenting which will prove conclusively

(*Continued on page 123*)

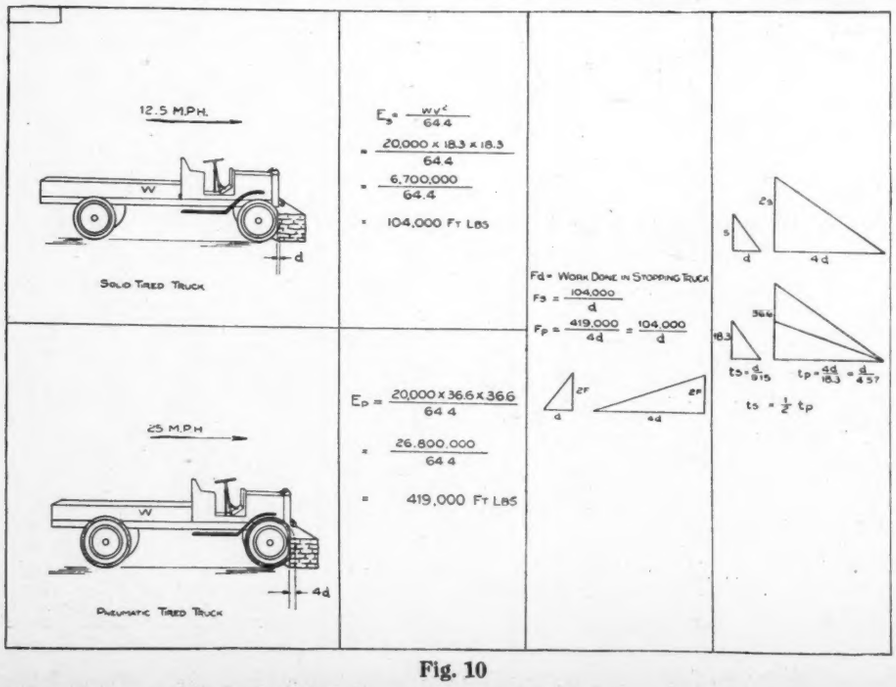


Fig. 10

SERVICE AND REPAIR DEPARTMENTS

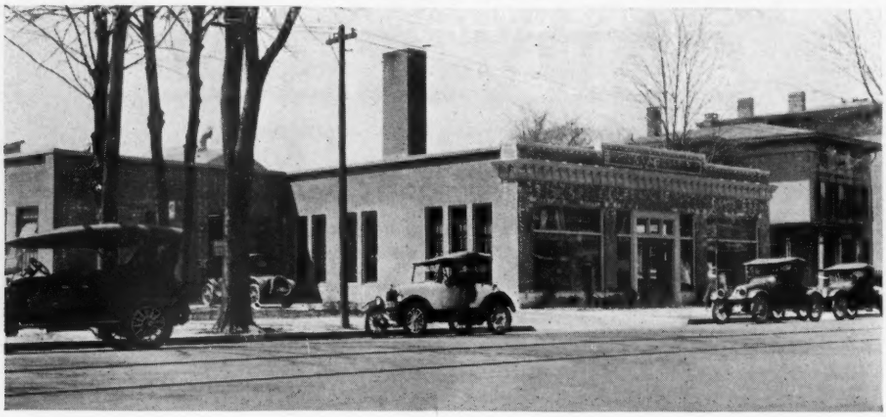
A Few Words Regarding This New Department

In past issues of The COMMERCIAL CAR JOURNAL the Service and Repair Shop end of the motor truck business indeed has not been overlooked; but, in those issues the articles on service, repair shop articles, and descriptions of new equipment of the Service and Repair Shop were scattered throughout the Editorial pages. For convenience sake, all articles or descriptions pertaining to these important phases of the industry will be included under the above heading in the future, in a separate department.

This department will contain articles of successful service stations and repair shops, with floor plans, layouts of stockrooms, and modern equipment; descriptions of tools and appliances useful to the repairman, and all such information as will help the dealer and repairman to give real service at the minimum of expense to himself and with the most satisfactory results to his customers.

How a truck manufacturer has solved the parts problem for the dealer, making it possible to obtain parts promptly by the small or isolated dealer, will be explained in detail in the Service Department of the January issue. It will also contain an article by a dealer, explaining how space can be conserved in arranging the parts room.

How a Large Service Station Handles Service



Taking Care of the Needs of Over Four Hundred Trucks is No Small Matter. Parts System Employed is Very Simple. Well Arranged Parts Room

By C. S. PERRIE

THOSE truck dealers who are unable to satisfactorily define service to their clients, particularly those dealers handling passenger cars as well, and who claim the service station is not self supporting let alone profitable, may be surprised to learn that there are many service stations that are being operated at a profit and that the service rendered bears a very important relation to sales.

The service station of the Geo. B. Wuestefeld Company, 190 Whalley Ave., New Haven, Conn., distributor for Pierce-Arrow trucks and passenger cars in that city, Bridgeport and Waterbury, is a concrete example of the possibilities of service, for statement is made that this tation led the country in service efficiency of Pierce-Arrow dealers and showed the greatest percentage of profits or returns. This company issues a neat brochure entitled, "Pierce-Arrow Motor Trucks in Connecticut," and in it four kinds of service are defined and guaranteed "that will assure efficient and economical truck operation."

The first service is defined as that inherent in the truck because of the quality of design, material, workmanship, etc. Second, inspection service rendered by the organization. Third, shop service maintained by the organization. Fourth, emergency service promptly available from this organization. As may be noted, emphasis is laid upon the quality of the truck merchandised and on the organization selling and maintaining it. It is a business-like appeal to the prospect and throughout he is not led to believe he is to receive something for nothing. The explanation of shop service is simple. "The most perfect truck will need repairs, and the most expensive item chargeable to truck operation is 'days out of service.' Therefore the shop service is a most important consideration. The ing but one type of truck since 1911 and company's mechanics have been repair- are able to do each job with the highest possible efficiency in the shortest space of time and at the lowest cost commensurate with good work." The introductory matter closes with this pertinent statement: "We call this matter of service to your attention, because it is of paramount importance. We trust that you will give these facts close consideration before deciding to purchase other than a Pierce-Arrow truck."

A View of the Parts Room Taken From the Repair Shop
Showing the large door through which trucks are shunted. This door is kept closed except when trucks pass in or out

A number of pages in the brochure are given over to a list of customers, number and size of trucks used, and the data is grouped under the various industries served. And the service defined is the service rendered, service paid for by the customer. It must be a successful service policy for the Geo. B. Wuestefeld Company is servicing over 400 trucks in its territory and is deriving a profit from the service station.

There are three factors contributing to the success of the service station and these are a building constructed for a service station and having equipment meeting every requirement of the truck, an organization of loyal employees, and a service superintendent who began at the bottom rung of the service ladder and is, therefore, a practical man.

An accompanying illustration shows the floor plan and dimensions of the building which is a one-story fireproof construction, combining under the one roof the service station, space for trucks and cars, show room and executive offices. The last named and show room are practically a separate building in effect, but have entrances to the middle room which in turn is separated from the repair shop. Attention is directed to large amount of floor space given over to the service station and its various departments and to the arrangement of the stock room which, after all, should receive first consideration in the planning of the service station.

The parts room is constructed of 4 foot

sheathing with wire mesh to admit light to the interior of the room. It has three entrances, one leading from the main room, another from the repair shop and the third from the street. The last named is utilized by parts room employees. Purchasers of parts are attended to at a window in the conventional manner; that is, a requisition is made out, parts supplied and paid for, entry made for the perpetual inventory, record of sale made on cash register, etc. Parts required by the repairmen are supplied on the presentation of a requisition at the shop window and the requisition is recorded, charged, etc. All parts leaving the stock room are thus accounted for by the stock room manager. He and his assistant only are allowed in the parts room proper, for they are accountable for any discrepancy in the inventory, and there is none.

Looking Down the Row of Work Benches in Proximity to the Pits
Showing racks over bench for retaining connecting rod assembly

The arrangement of parts is conventional in that use is made of L shaped compartments, back to back, the upper sections being given over to small parts and the lower comprising the usual bins for large parts. The system differs in that use is made of standard bread tins instead of fixed compartments, and there are ten rows of tins with seven tins to a row or a total of 70 boxes or compartments on each side of a section or L. The ends of the tins are painted yellow and the numbers are in black paint.

Simple Parts System

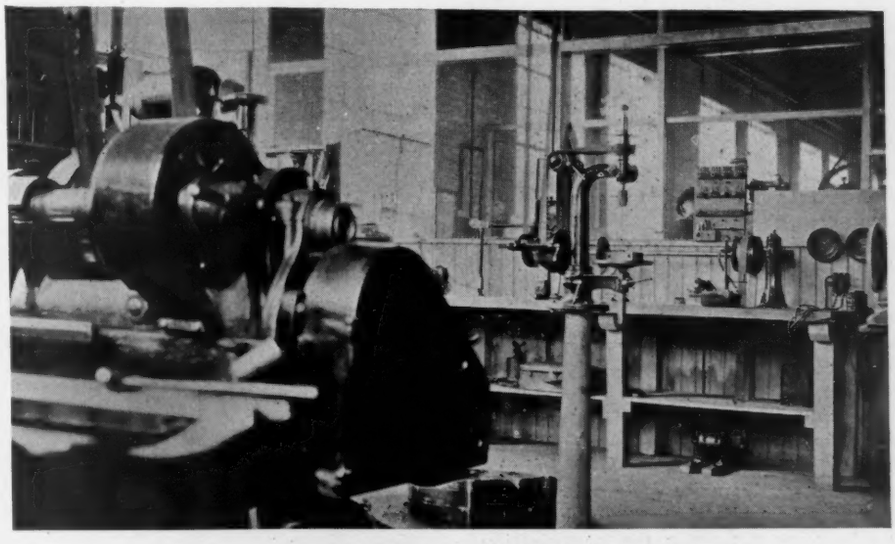
The parts identification system is conventional. The sections are lettered A, B, C, etc., the shelves numbered and pans lettered. This is a simple system, for when a part is required the index is consulted, the section letter ascertained, also the shelf number and pan letter. The pans or containers also bear the manufacturer's parts number and parts for various models are designated by the series number. The bins are numbered in order and under the letter of the section. The index is the visible rack type and the use of a perpetual inventory and rule of nothing given out without a requisition avoids the possibility of leaks. The larger parts, fenders, hoods, etc., are stocked in a room over the parts room and access to the former is by stairs inside of the parts room. The small material, such as cotter pins, lock washers, cap and machine screws, etc., are arranged in bread tins on shelves near the shop window and while the tins bore the dimensional data, etc., they were not numbered at the time the writer visited the station. They are, however, to be included in the general parts system. Standard supplies, such as cap screws, lock washers, cotter pins, machine screws, gaskets, brake lining, etc., are bought in large quantities and are, the stock room manager states, purchased direct when possible. Equipment and supplies for the truck are merchandised, it being the policy of the company to supply that which will afford the users the best service.

The service station is departmentized, there being six main departments and some of these are subdivided. All are responsible to the service superintendent, Edward F. Coogan. The stock room department head is responsible for his clerks, while the head of the repair shop department answers for the machine shop, chassis, engine, electrical and metal departments. The sale and repair of tires, solid and pneumatic, as well as results obtained from the tire press, are up to the head of the tire department. The other departments include the paint, testers and head service checker and tester.

The system for estimating cost of repairs, inspection for work, parts, paint, metal work, etc., and for keeping track of the orders is simple, for Mr. Coogan believes there is such a thing as too much system or detail. He believes that with capable heads a department can function to the satisfaction of the customer and company. Accompanying illustrations show the main features of the recording slips of a job going through the station. One sheet is 8 by 11 in., a single sheet, on which is detailed the instructions. A job number is then assigned and an order made out in duplicate, one sheet going to the office and the copy to the head of the repair department. Orders or requisitions are made out for work in other departments, and all are signed by the heads. All memoranda ultimately finds its way to the office and the duplicates serve as a check.

Methods Make for Efficiency

The paint, machine shop, metal room and tool room are separated from the main repair shop and workmen from one department are not allowed to enter other departments. In other words, Bill Jones, of the engine room, is not allowed to visit Bill Smith, of the electrical department, and talk over social matters on a pretext to the foreman that "I had to see Bill about that mag on that truck I am working on." Owners of cars and



A Section of the Machine Room and Electrical Department
Showing testing stand and apparatus with which this shop is thoroughly equipped to overhaul, magnetos, motor starters and generators

trucks are not allowed in the repair room except on very urgent business and when they do they are accompanied by the service head. All cars are brought into a large room at the entrance and shunted through the opening to the repair shop, and the door closed. Completed work is ready for the owner in the large room adjoining the repair department.

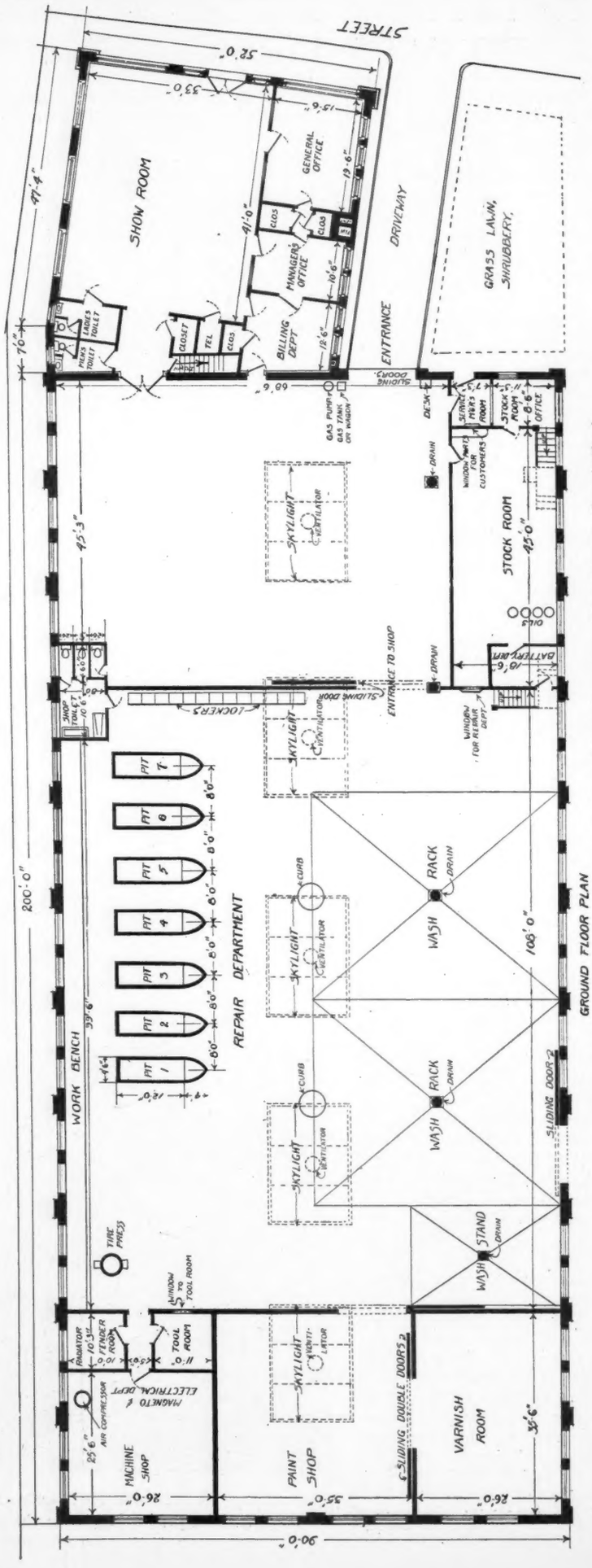
The repair shop and its departments does not vary from other well arranged service stations. A job is assigned a space and a pit, and the workman has his bench, tools and locked drawers for parts, etc. The method of supplying special tools to the workmen is conventional in that brass checks are given in for a tool, but differs in one respect in the way carelessness in working with drills, taps, reamers, etc., is corrected. If a workman checks in for a drill, then comes back for another of the same size, saying he has broken the first drill, he is told he must get an order from the foreman. This plan stops waste and makes the men more careful for the foreman will ask the usual why. The tool room manager informed the writer that the saving effected by this method is considerable and quoted figures which indicated that some of the service station overhead can be eliminated by similar methods.

Hold Department Conferences

Reference has been made to the "organization" in the early part of this article. It is not an organization in the sense of the word but one having loyalty of the employees as the fundamental principle. Every two weeks during the summer season when the station is rushed with work, there is held a conference of the heads of the various departments. Problems of each and complaints are threshed out and suggestions for improvements entertained. The employees of the different departments are encouraged to make suggestions to their heads and whenever a workman does so and his plan is feasible, he is given credit for it. This is an incentive to the men who too often see their "thunder" stolen by the foreman. During the winter the conferences are held weekly.

"Our organization, which numbers about 60 employees, is just one big family," said Mr. Coogan in discussing his system. "The parents are the heads of the departments and company and the employees the children. I have a loyal bunch of men who have the interests of the company at heart. Whenever the boys hold a social gathering they always invite me and I make it a rule to attend. I take in their bowling games and other pastimes and when with them I am one of them.

"No, they do not take advantage of it. When in the shop I am the service superintendent and never have I found a man taking advantage of knowing me as Ed on the outside. If we take a new man and he does not fit in the organization, as one of those trouble makers sometimes found, he is dropped from the pay roll. There isn't a man in the shop but



The Ground Floor Plan of the George B. Wuestefeld Company, New Haven, Connecticut
It is of brick and concrete construction, well-lighted by large skylights, has few posts and contains among other modern equipment an exhaust system for removing exhaust gases, etc. Artificial light is not required even on dark days

STOCK REQUISITION

Deliver to..... Date..... 191

Charge to Job No.....

QUAN.	PART No.	DESCRIPTION	PRICE

Foreman..... Stock Clerk.....

Right: Shop Instruction Sheet Made Out in Duplicate.

Left: Requisition Without Which No Parts, Gas, Oil, Etc., Can be Obtained.

Below: Single 8x11" Sheet Used to Indicate Work Needed. It is Filed in the Office.

Order No..... Date.....

Owner..... TRUCK No.....

Address.....

Promised.....

Odometer Reading.....

INSTRUCTIONS

Above order given by.....

what will work overtime if necessary or come out at any hour of the night to render emergency service. If we find it necessary to work nights and Sundays to get a truck out on time or a special rush job, the boys respond. They are paid well and recompensed for overtime."

Selling the Service

The brochure of the company defines the emergency service as follows: "When a truck gets in trouble the most valuable service is that which comes the quickest. The company is equipped for instant action. Regardless of where a Pierce-Arrow truck may be, night or day, this organization can put it back on schedule with a minimum loss of time. This work is done through our inspectors, our ship force and our service wagon, and is facilitated by the fact that having rendered emergency service for the past seven years we know what to do and how to do it best and quickest." And this in a nutshell is the service policy of the company. A service that keeps the truck on the road with a minimum loss of time—but the customer pays. This service is afforded any Pierce-Arrow truck owner in the territory, and is rendered an out of town truck in the territory. Service is given owners of other makes of trucks, but the customers of the company have the call, first, last and always.

Emergency service can be obtained by

THE GEO. B. WUESTEFELD CO.

Order Date..... 191.....

Owner..... CAR / TRUCK No.....

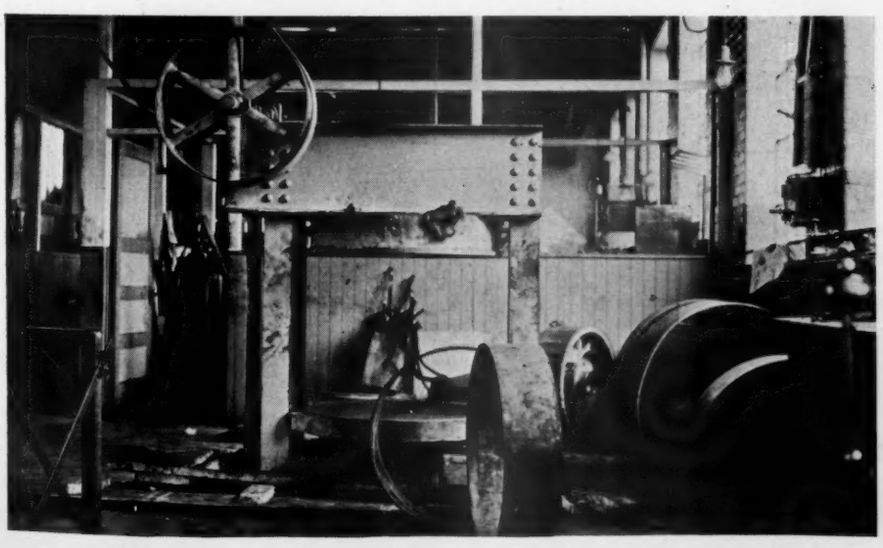
Address.....

Promised.....

Odometer Reading.....

INSTRUCTIONS

Above order given by.....



A Solid Tire Press is a Feature of the Service and Has Proved Very Profitable

a customer by telephoning Mr. Coogan or the repair shop head. On receiving a call the needed men are picked up by the service wagon after notification, if late. An example is the case of a truck from Wilmington, Del., that met with an accident near New London, Conn. At midnight the crew was on the job and the truck on its way at four, although it ran off the road into a field and was badly damaged.

The inspection service referred to consists of three highly trained men and every truck in the territory is visited every 30 days and sometimes every two weeks. This inspection extends over a period of three years and is the only free service the owner receives. The inspection report is made out in duplicate and the driver of the truck is asked to sign. The policy is not to go over the driver's head, but to obtain his co-operation. If an inspector reports certain work essential and the truck does not come in to

the station, the owner is notified. There is a follow-up system including personal letters to the owner. The final effort is a call on the owner by the inspector. Copies of the inspection reports as well as of the letters mailed the owner are filed and indexed, making it a simple matter to supply concrete evidence to the owner of his neglect to heed the warnings given.

Tire Press Service

About eight months ago Mr. Coogan advocated the installation of a solid tire press which has proven very satisfactory not only from an investment point of view, but because of the service afforded customers. Formerly the work was sent outside and very often delays ensued. And there was the angle of the customer calling on the tire man whenever questions arose as to the tire, etc. All this has been eliminated by stocking tires and installing the press. The service angle is that a customer can have a tire pressed off and a new one pressed on whenever it is convenient to spare the truck. Another angle is that the customer is educated to come to the service station for all equipment, etc., required. The effect indirectly is to teach the owner to rely upon the service station and to anticipate to a very large extent the owner's requirements.

The Geo. B. Wuestefeld Company attained success by ironing out the greatest wrinkle in the merchandising of trucks and that is service. Success was not attained in a few months. It took years to develop a service policy that would meet the requirements of motor highway transportation and permit of the profitable merchandising of service which after all is reducing "days out of service" to the minimum by supplying parts promptly and installing them as well as accomplishing other needed repairs quickly and efficiently, and if the shop service is efficient the cost will be low. Truck dealers who are in the immediate neighborhood of the Geo. B. Wuestefeld Company will be recompensed for the time and money spent visiting this service station. It has been inspected by dealers from all over the country, and if the visitor is fortunate enough to pry Mr. Coogan loose from his duties for a few minutes, as did the writer, he will find that the manager of the station can expound some excellent thoughts on why some truck dealers fail on truck service. As previously stated in the early part of this article Mr. Coogan rose from the ranks and is intensely practical.

Service is Ninety Per Cent of the Truck Business

By EUGENE P. HERRMAN*

SERVICE is rendering what is needed at a time it is needed, in the shortest space of time and at the lowest possible cost consistent with good business practices—**not something for nothing nor doing something when one feels like it or when convenient.**

Bear in mind that the days are ended when the popular slogan was "The Public Be Damned." The motto of the largest public and private corporations of today is, "The Voice With the Smile Wins," "We Have Nothing to Sell but Service," "Ask the Man Who Owns One," etc. Therefore, when a business man, especially one who is in the automobile business, will consider that the largest corporations in the world find it their biggest and most profitable advertisement to please their clients and customers with A1 service, surely the medium sized and smaller business man cannot go wrong in following such examples.

Service is Ninety Per Cent

We in the motor truck business find that 90 per cent. of our business consists in giving service, but this has such a vague and ambiguous meaning in the past that we must strive mightily to give that word a real meaning, and in doing this, our business will be put on a higher plane and the **merchant with whom we are doing business will be inspired with confidence and selling resistance will have been reduced 50 per cent.**

In the writer's business he has adopted Marshall Field's slogan, "The Customer Is Always Right," and also that saying in the Bible, "As a Man Thinketh In His Heart, So He Is." In other words, the merchant, whose patronage we enjoy, has been assured that we have sold him a machine that would be profitable and helpful in his business. Therefore, when he is in trouble, he looks to me with confidence that I am ready, willing and able to take care of him and it is the first duty of us all to not shake this confidence that he has reposed in us, but to care for him, and **to do it now.**

Service Means Keep the Wheels Turning

Now comes the crux of the whole service situation. The merchant's truck is in the service station, not making any money, and his delivery service is tied up. Now if the dealer is on his job, he has parts in stock and well trained mechanics to do the job, and he does it at once. Now my second slogan comes into the situation. The dealer knows and I know whether what has caused the truck to break down is due to the way the truck was handled or cared for or whether it is one due to poor material or defective assemblage at the factory. If it is due to defective material or assemblage, don't charge your customer, but lay the entire case before the factory you represent, and you will get treated fairly by any manufacturer, who is zealous of his merchandise and his reputation. If it is due to neglect on the merchant's or his chauffeur's part, then charge him a fair and reasonable price, and he will gladly pay your bill, but above all, **get him back on the streets with all possible haste.**

In order to accomplish the above, the dealer, be he large or small, must have **a stock of repair parts in proportion to the number of trucks that are running in his territory,** and a reserve supply for those he reasonably expects to sell.

The Small Dealer and Parts

The question arises that the small dealer or one starting in busines may not have sufficient capital to carry the parts that he needs or requires. Then the matter should be discussed at once either direct with the factory he represents or the distributor with whom he is connected. There are only two ways in which this can be settled. One is that the parts be put in on consignment, which is unsatisfactory to all concerned at the best, due to the expense of details connected with it. The other is that the dealer, if his reputation for honesty and fair dealing is good, can offer his notes or trade acceptance for a period that he would be sure to be able to pay for this merchandise stock without embarrassment to him, and satisfactory to the factory or distributor.

How Manufacturer Can Aid

The manufacturer should be willing to co-operate in this, which will readily help the sale of his trucks and build up his biggest asset, Good Will. Furthermore, the manufacturer should continually have his expert service men visiting his dealers' service stations, making good suggestions where he can, and showing the men in the service station the way service can be rendered when needed, in an intelligent and satisfactory manner to all concerned.

One of the most perplexing problems is the customer for whom you strive to please but find it impossible to do so. With him you must try and try again, and if you find it impossible, there are only two ways left. One is to buy back the truck you sold at a reasonable price, or else tell him in plain English that you find it impossible to please him, and that it is best he goes elsewhere.

In conclusion, if you would be a successful dealer, be honest to yourself, your customer and your factory, **watch your service as you watch your bank account,** and your sales will take care of themselves. Be courteous—"The Voice With the Smile Wins."

* Mr. Herrman, who is distributor of Stewart trucks over a large territory, and who employs twelve salesmen besides a transportation engineer, is accounted one of the most successful dealers in the East. He rose from the ranks of salesmen through sheer ability and persistence. The executive offices, sales, show and service departments of the Herrman Motor Truck Co., Inc., are at 607-15 West 57th St., New York City.

Meeting Service Station Requirements Where Space is Limited

How the Federal Motor Truck Company, of New York, Converted a Passenger Car Garage Into an Efficient Service Station. Sales and Service Are in the One Building and Prominence is Given to Location of Parts Room

By C. P. SHATTUCK

WHERE space is limited because of high rentals, as in large cities, and a building not designed for a service station is taken over, the division of the floor space and arrangement of the departments so as to meet service requirements without unduly sacrificing efficiency, needs careful consideration. This is particularly true when the sales, service and executive departments are contained within the one structure and where provision must be made for an adequate showroom. The general practice in large cities like New York, Chicago, Boston, etc., is to separate the salesroom from the service station, locating the former on automobile row, or reasonable proximity, and placing the service station where real estate per square foot is not so expensive.

Separate Service From Showroom

It is safe to assert that over 90 per cent. of the truck representatives in New York and other large cities handle the problem in this manner. An advantage claimed for this arrangement is that it affords representation on automobile row, or near it, where a certain amount of publicity is said to be obtained from a well-appointed showroom.

A Section of the Parts Room, Showing Double Spaces for Large Parts, Such as Ring Gears, Etc. Removable Floors Permit of Increasing Space When Desired

Certain dealers, and successful ones, too, however, have departed from this practice and among them is the Federal Motor Truck Company, of New York, factory representative of the Federal Motor Truck Company. When this company decided to establish a factory branch in New York it was more economical to rent or purchase rather than construct, owing to the time factor, and arrangements were made to take over a nearly completed two-story building designed for a passenger car garage, and arranged to store rather than afford service. This building is on West Fifty-seventh Street and some distance from Broadway or automobile row.

The building is about 90 x 100 ft., of brick and cement construction, and access to the second floor is by a ramp with quite a sharp pitch. After carefully analyzing the space problem Manager R. S. Locke and Assistant Manager A. A. Hamilton divided the floor space and arranged the departments as shown by the accompanying diagram. A noteworthy feature of the arrangement is the giving of prominence to the stockroom. This is about 25 x 45 ft., and is separated from the other spaces by a framework covered with ½ in. square wire mesh. A convenient entrance for purchasers of parts, dealers and customers, is provided by a door leading from the street, while the window through which the mechanics obtain parts and tools is located at the rear and cannot be seen either by the customer at the front parts window or the driver who runs his truck in to the space at the left of the parts room. What either can see is a large, well-arranged and heavily-stocked parts room, with everything in perfect order and that is just the result the branch heads desire.

An accompanying diagram illustrates the layout of the parts room. The parts compartments and bins are constructed of wood, as metal racks were not obtainable at the time and the construction, although of the familiar double L shape, differ from the conventional wood type in that they are made in sections and so constructed that a section can be easily removed and placed elsewhere. Those storing the small parts are four in number, 6 ft. long, 43 in. high and 12 ft. wide. There are six rows, of 10 compartments to a row. The large bins are 6 ft. long, 3 ft. high and 20 in. wide, and these, like the smaller units, are retained in position by metal strips.

Flexible Compartments

Another feature of the construction is that the floor or bottom of each compartment is removable, being suspended by angle iron sills, an arrangement facilitating doubling or tripling the space, as may be required. The strip across the face of the compartment is, of course, removed. An examination of the illustration will show this feature, which is essential to the storing of such parts as ring gears, etc.

The large parts, truss, tie and reach rods, propeller shafts complete, etc., lengthy parts, are carried in a rack resembling that used for umbrellas. This rack has 16 spaces, 12 x 12 in.

Springs, axles, etc., are stocked under the platform of the parts managers. A bench on which orders are packed for shipment, but which is not shown in the illustration, as the parts manager said "it did not look nice enough," extends from the middle small parts section. Wheels, radiators, tires, fenders, etc., now stored on the second floor, are to be carried in a room adjacent to the locker room. Racks for these were being constructed when the writer visited the station.

Factory Stock Card System

The arrangement of the parts, stock cards used and method of keeping record of parts, etc., is the same as that advo-

PRICE | 3 | PART NO.

CHG. TO | DATE | NAME OF PART | RATIO OR SIZE

AISLE | USED ON MODELS | SUPERSEDED BY OR SEE

BIN | NUMBER USED | MINIMUM OR LOW MARK

DEALER'S NAME | REMARKS

ORDERS					RECEIPTS				
DATE	AMOUNT	DEALER ORD. NO.	FACTORY ORDER NO.	DATE ACKNOWL.	DATE	AMOUNT	BAL. DUE OR BACK ORD'D	INVOICE NO	INVOICE DATE

SALES | LOW MARK

SALES

DATE	TO WHOM	AMOUNT	BALANCE IN STOCK	DATE	TO WHOM	AMOUNT	BALANCE IN STOCK	DATE	TO WHOM	AMOUNT	BALANCE IN STOCK

MONTHLY RECORD

JAN.	FEB.	MAR.	APR.	MAY	JUNE
JULY	AUG.	SEPT.	OCT.	NOV.	DEC.

BIN CHECK

DATE	AMT.	DATE	AMT.

Card Index of Federal Parts Accounting System

For locating part in bins, low mark, keeping track of ordered material, sales, etc.; also affords simple monthly record and check on stock. It is well adapted to the requirements of the small service station

cated by the Federal Motor Truck Company, and the instructions supplied the new dealer by Service Manager E. A. Haskins, of the factory, best explains the system in vogue. The instructions are as follows:

"Our numbering system is so arranged that the first figure of the symbol number indicates the group or unit on which the part is used. In other words you will notice all parts beginning with '1' are parts used on the engine proper. All parts beginning with '2' are used in connection with the gasoline line, '3' exhaust system '4' cooling system, including radiator, etc., and as you go up the line you will find that '7' covers all clutch parts, '8' transmission parts, '11' rear axle parts, '12' front axle parts, etc.

"The letter in a number A, B, C, D, etc., indicate only the relative size of the parts and these letters indicate the size of the sheet on which the part is originally drawn up, A being the smallest, B the next, etc.

Cards Carried in Cabinet

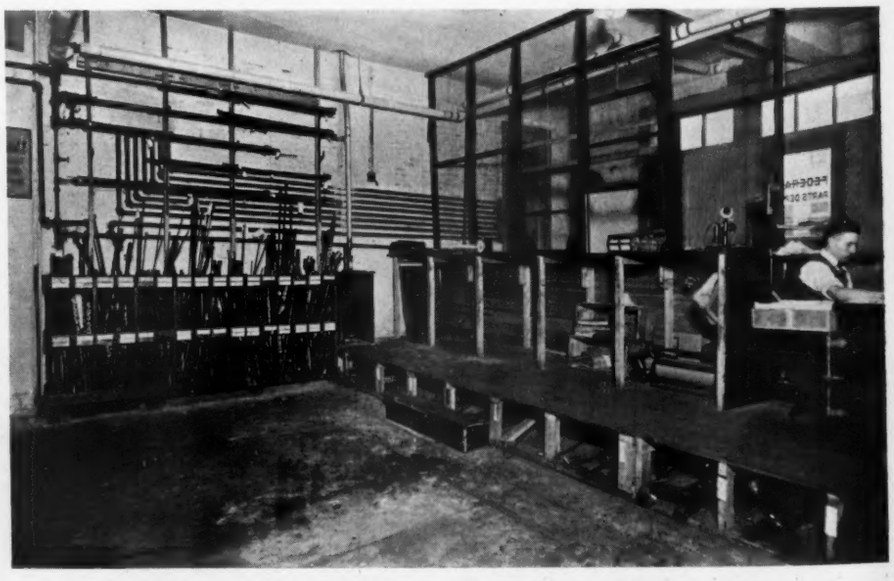
"Relative to the arrangement of the stock in your stockroom and the cards in your card cabinet we believe there is only one way in which to arrange these so as to make them possible of expansion without trouble, and also make it possible for anyone who lacks thorough knowledge of the stock to be able to locate any part. Your stock should be located numerically in its bins. In other words, start with the smallest numbered parts and proceed in the regular system up to the largest groups, that is, start with 1A1 ending with your 16 group. Allow no stock bins for parts which you are not carrying in stock, consequently there will be no more bins than as though you arranged them without any regular system or arrangement according to units, and this arrangement according to units makes it possible for several parts to be carried in the stockroom in different places because they are being used in more than one place without your knowledge of this duplication. Leave a few vacant bins in the end of each section for enlargement of stock or additional parts.

"The numerical arrangement of the different parts makes it possible also for any one knowing the symbol number of the part to locate the part in your stockroom; it is then unnecessary to refer to any index or card system to find out where the part is, as the number shown will numerically determine the position of the bin. In this way you cannot give the bin a number other than the symbol number of the part itself.

"Your cards will then be arranged in the same manner, that is, the 1A1 or the first card covering the first part you have in stock according to numerical arrangement will be the first card in the box leading on top.

Changes in Price, Etc.

"Now look at the cards (reproductions of these are shown) and we will explain the reference for which the card itself is used. On the extreme right hand upper corner you will find a space marked 'No.' In this space you put the entire number of the part. You will use a card bearing a tab number which corresponds with the last digit in the figure. In other words, for part 8 A 2008 you will use card bearing a tab with the figure '8' on it, also 1A28 will be placed on the card bearing a similar tab and all symbol numbers ending with eight will be on an '8' tab card or numbers ending with '3' will be on a '3' tab card. In the middle



View From Interior of Parts Room, Showing Bin for Lengthy Parts

Axles, etc., are stored under the platform. Note the compressed air tube communicating with cashier and card cabinet or index to parts on manager's desk

SUMMARY

ORDER No. _____

INVOICE No. _____

Date	Req. No.	Pcs.	ITEM	Parts Cost	Parts Sales	N. Y Costs	N. Y Sales	Sales Total
			TOTAL					

No.	Name	Hrs.	Rate	Amount	No.	Name	Hrs.	Rate	Amount
						TOTAL			
						GRAND TOTAL			

TIME _____

MATERIAL _____

Left: Showing Reverse Side of First Order Sheet, Illustrated Below; Serves to Record Parts, Labor, Etc.

Below: Illustrates Shop Order and Inspection Sheet. Numbers Are Utilized to Indicate Work Required. The Original Goes to Office, a Copy to Foreman and Customer. Work Order is Attached to Chassis in Leather Case

of the card place the part name. In the upper left hand corner you will find a place for the price and two or three spaces below it for changes in price and the date on which the change was made. If desired the models on which the part is used can be placed in the square indicated under 'used on models' and 'numbers used.'

Tickler Feature on Back Orders

"On the body of the card, under the word 'orders,' you will post the date, the amount ordered and your order number whenever you make out an order for any of these particular parts, posting this on the cards and posting each part ordered. As soon as you get our factory acknowledgment, post the factory order number and the date of acknowledgment. The next thing to reach you should be the invoice. Post the date of the invoice and its number. Upon receipt, the date the part is received, the amount received should be entered and any back number ordered should be indicated in the column for back orders.

"With this information any question relative to particular part which you may have ordered can be determined in a few seconds after examination of the cards. You know when your order was placed and you can also tell your customer when the parts should be there after you have received the invoice which date will show the date of shipment.

"On the reverse side of the card (also shown) is the place of your disbursements or sales, the date of sale, to whom made or your invoice number will be listed in the column headed 'To Whom.' The amount sold, that is, the number of the parts, one, two, or ten, not the amount in dollars and cents, and the balance in stock after deducting the sale from the number in stock before the sale was made, will be shown.

Determining the Low Mark

"At the end of each month the summary of the number sold during that month should be recorded in the monthly record at the bottom of the card. After this has been in operation a few months you can readily determine the monthly

NAME _____ SHOP ORDER No. _____

ADDRESS _____

_____ DATE _____

CHASSIS No. _____ MOTOR No. _____ LICENSE No. _____ TRUCK No. _____

Motor Cars on our premises for storage or repairs are at owners fire risk. Cars driven by our employees only at owners risk

✓		✓	INSTRUCTIONS	✓	
	MOTOR		CLUTCH 7		INSPECTION
	Main Beamgs 10				
	Conn Rod Bearings 10		UNIVERSAL JOINTS 7		REAR AXLE 12
	Valves Ground				
	Governor None		TRANSMISSION 7		FRONT AXLE 1
	Wiring 10		Gear Shift 7		
	Magneto 4-8		SPRINGS		SELF STARTER SYS. None
	Carburetor 7		Right Front Reset		HORN "
	Oil Pump 1		Left Front "		WINCH "
	Water Pump 7		Right Rear "		HOIST "
	" Plugs 1		Left Rear "		RADIATOR New
	" Hose 2 New		Spring Clips 5		FRAME 12
	Battery None		" Shackles 6		HOOD New
	Fan Assembly New Belt		" Bolts and Bush 10		HUB ODOMETER None
	Accel " 3		" Hanger Brkts 1		MUFFLER 10
	Front End Gears 7		WHEELS		OIL CUPS 3 Missing
	Cylinders 11		Front 1		GREASE CUPS 3 "
	Carbon 8		Rear 1		FENDERS
	Oil Level 1		TIRES		Right 2
	Compression Bad		Front Good		Left 2
			Rear Fair		LAMPS
	STEERING		BRAKES		Dash Missing
	Post 7		Foot 10		Tail None
	Connections 7		Hand 10		TOOL BOX 1
	Conn-Rod 7		RADIUS RODS 6		BATTERY BOX None

GENERAL REMARKS Straighten Dashboard & Windshield
Repair Radiator & Guard
No Truss Rod
Right front goose neck needs renewal

This Order must not be destroyed. If cancelled return to accounting Dept.

KEY

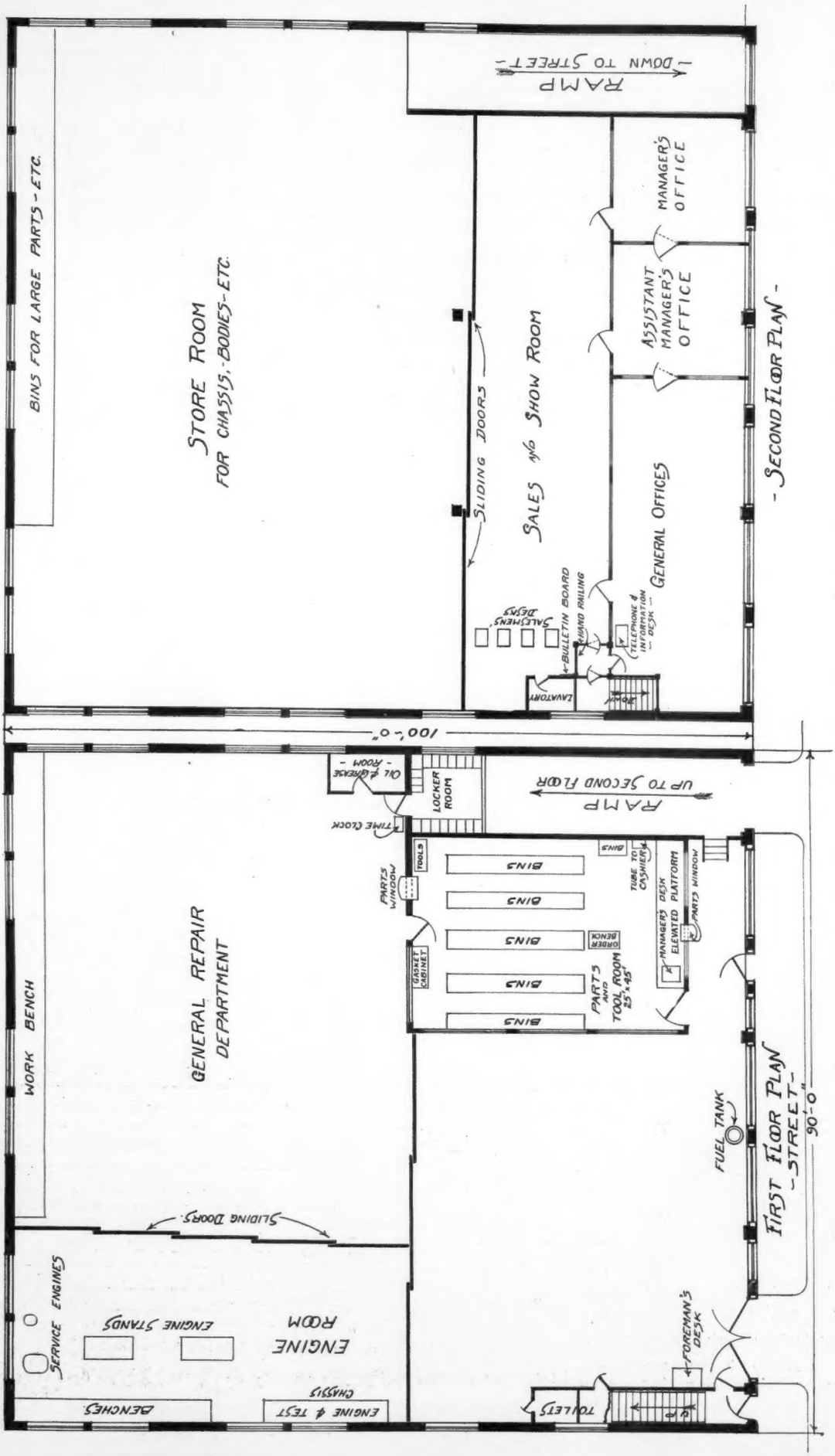
1. O.K.	5. Should be tightened	9. Needs lubrication
2. Needs slight repairs	6. Should be rebushed	10 Should be renewed
3. Needs extensive repairs	7. Should be overhauled	11. Report after disassembling
4. Should be adjusted	8. Should be cleaned	12. See General Remarks

☐ You are hereby instructed to make repairs as indicated above. Perform only the labor directed.

☐ Make any other minor adjustments considered necessary

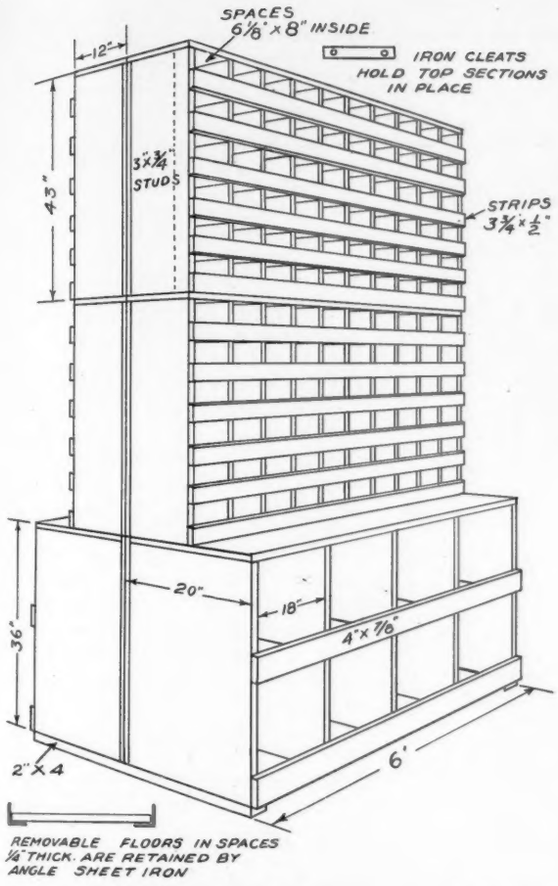
INSPECTED BY _____ SIGNED _____

OFFICE _____



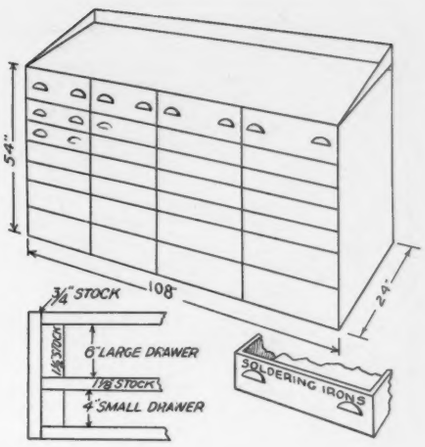
Floor Plans of Service Station, Show Room, Sales and Executive Departments of Federal Motor Truck Company, of New York

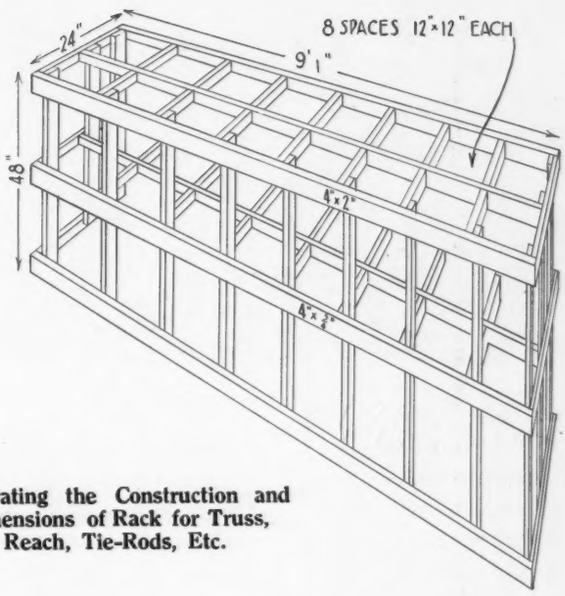
Prominence is given to the parts room in which the construction of a flexible type of bins is a feature. Note the use of doors that slide by each other facilitating entrance and exit without the usual maneuvers. The structure was built for a passenger car garage



Dimensional Sketch of Parts Compartments and Bins, Any Section of Which Can be Easily Displaced and Moved

Right: The Taps, Dies, Reamers, Drills and Special Tools Are Kept Clean and Convenient in a Special Tool Cabinet

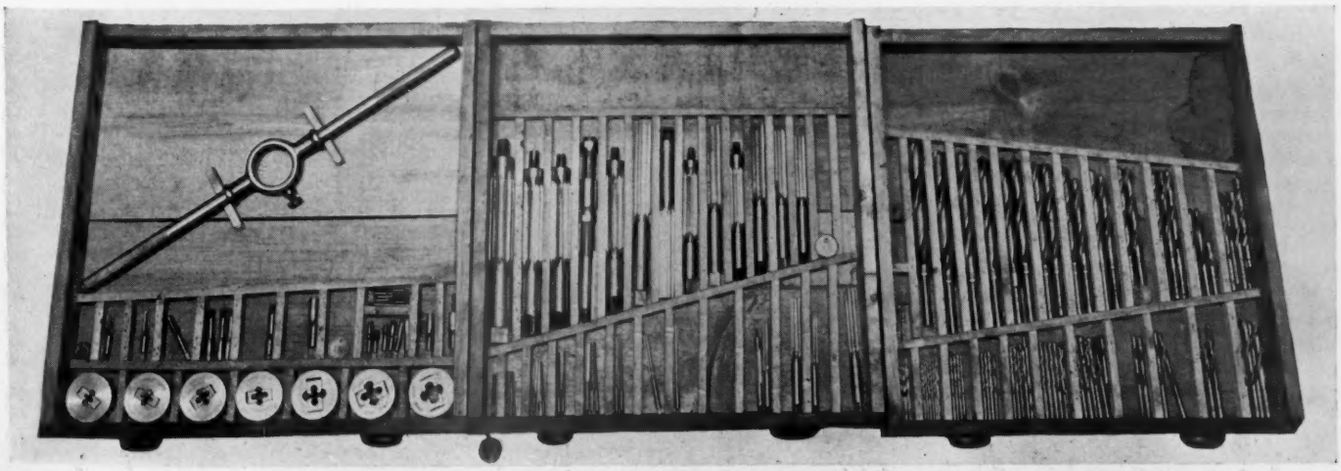




Illustrating the Construction and Dimensions of Rack for Truss, Reach, Tie-Rods, Etc.

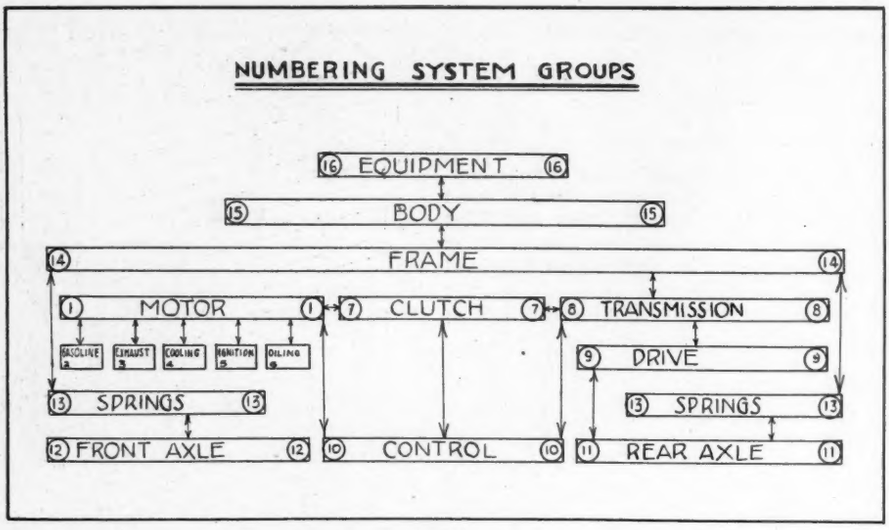
average of your sales and this will permit you to determine a low mark for the upper right hand corner of the reverse side of the card, so that when the balance in stock reaches this low mark you will automatically re-order. This low mark will be determined in sufficient time to permit you to order and receive stock from us without running out of any particular parts. This will permit you of carrying a maximum number of different parts on a minimum amount of money invested in the parts.

"It is occasionally desirable to make an actual, physical count of the parts in the bin and check them with your card records. The lower left hand corner of the reverse side of the card permits of such records being made after the count has been taken and this permits you of keeping account of any discrepancies which are shown up between the actual count and the record of your card. For large or bulky parts, such as crankcases, propeller shafts, etc., do not



Illustrating Arrangement of Spaces in Drawers of Tool Cabinet

A double checking system is employed, a check being attached to outside of drawer to indicate that tool is out of drawer



1	MOTOR	Comprising complete motor less pump, oiler, timer, carburetor, manifolds, clutch, oil and grease cups, timer drive, etc.
2	GASOLINE SYSTEM	Comprising gasoline tank valve strainer and piping, inlet manifold, carburetor priming rods, hot-air intake pipe and valve, etc.
3	EXHAUST	Comprising exhaust manifold, exhaust pipe, muffler cut-out valve, etc.
4	COOLING	Comprising radiator, manifold, pump hose connections, etc.
5	IGNITION	Comprising magneto timer, timer drive, wires and housings, coil switches, etc.
6	OILING	Comprising oiler sight feed oil tank, tubing, all oil and grease cups.
7	CLUTCH	Comprising complete clutch and universal connections to transmission or drive shaft.
8	TRANSMISSION	Comprising complete transmission and transmission brakes.
9	DRIVE	Comprising chains or drive shaft, universal joints, etc.
10	CONTROL	Comprising complete steering gear side, steering tube pedals and shafts, control levers and shafts, muffler cut-out, trigger and all rods, links, pins, etc., used in connecting the above to parts controlled.
11	REAR AXLE	Comprising complete rear axle brakes, wheel hubs, etc.
12	FRONT AXLE	Comprising front axle steering knuckles, wheels, cross-rod, etc.
13	SPRINGS	Comprising front and rear springs and shackle bolts, etc., used in the construction of the springs.
14	FRAME	Comprising complete frame with all parts riveted thereto.
15	BODY	Comprising complete body with all trimmings, dash, hood, running boards, etc.
16	EQUIPMENT	Comprising tools, lamps, tops, bumpers, horn, etc.

Chart Illustrating Federal Numbering System for Parts in Which First Figure of Symbol Number Indicates Group or Unit of Parts

put in regular place according to number, but indicate in proper place or bins where they can be found."

At the New York branch the parts manager has devised what he terms a quick reference for the card cabinet. It consists of using white tabs for separating a given quantity of numbers and for locating quickly certain groups, thereby saving considerable handling of cards.

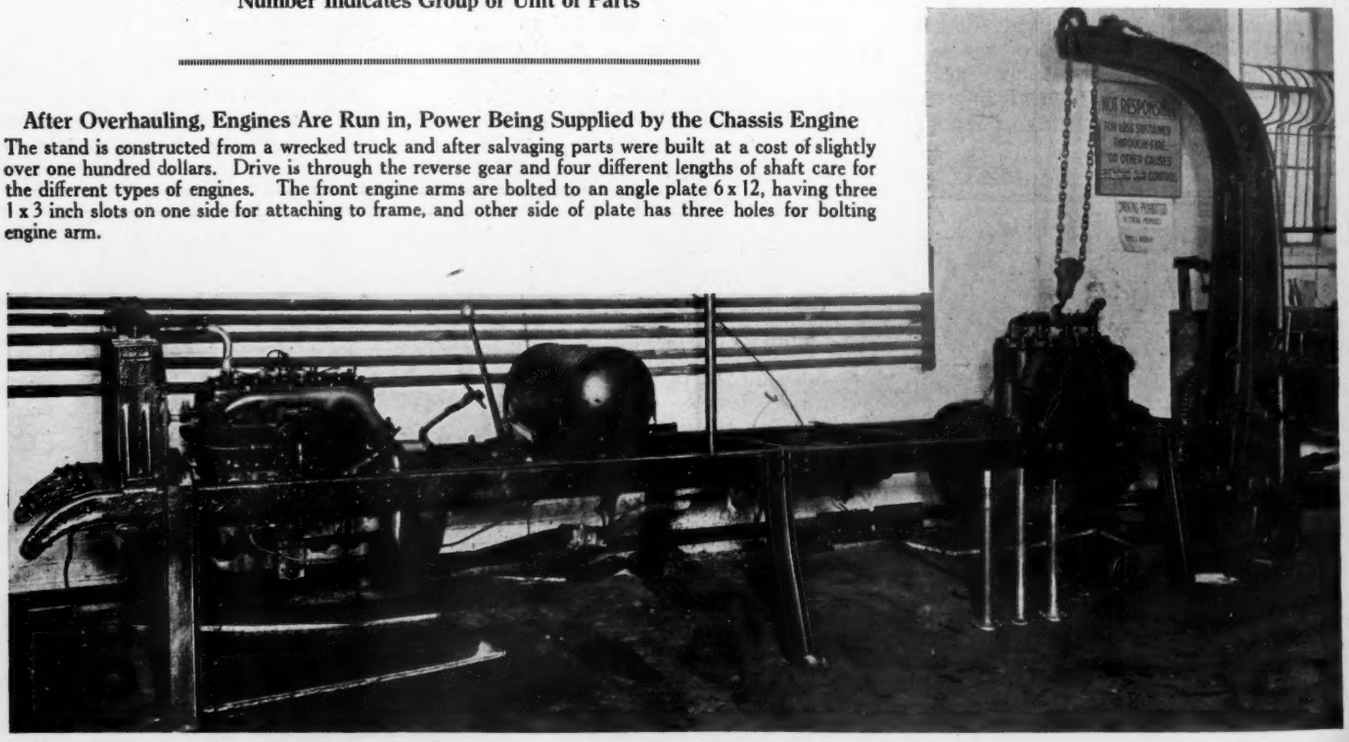
Special Tool Cabinet

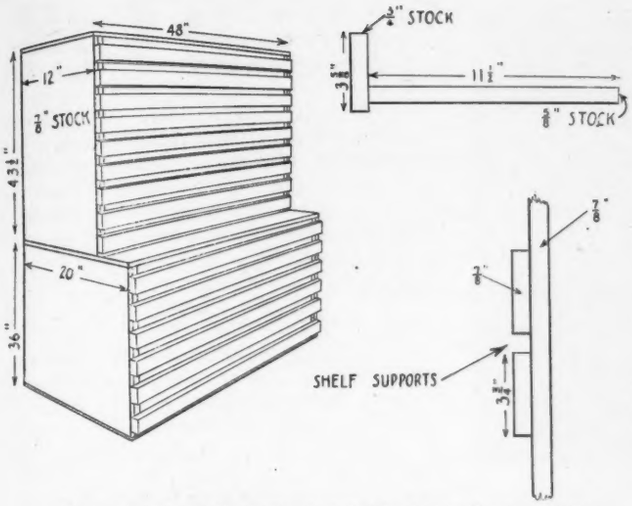
Unlike the average service station the tool room is part of the stock room, being located at the rear and having a window communicating with the main repair room. The arrangement and handling of the tools, such as taps and dies, reamers, drills, etc., differs from the conventional. Instead of being on shelves or suspended on nails or hooks, all tools are carried in a special tool cabinet at the right of the window. This cabinet is 9 ft. long, 4 ft. 6 in. high and 2 ft. wide, has 16 large and 20 small drawers.

A double check system is employed instead of the single check method. If a workman requires a certain sized reamer he gives in his check and receives the tool. The tool man then takes this check and places it in the compartment of the drawer from which the tool was taken, but he also hangs a brass check on the outside of the drawer. This is done so that he can determine at a glance the drawers from which tools have been issued. Otherwise he would be obliged to open every drawer to ascertain if any tools were out. This conservation of time is appreciated by the tool man in checking up at closing time. The advantages of the cabinet are that the tools are kept clean and not exposed to dust, space is conserved, a neater appearing tool room is obtained and the drawers being lettered facilitate location of a tool by those

After Overhauling, Engines Are Run in, Power Being Supplied by the Chassis Engine

The stand is constructed from a wrecked truck and after salvaging parts were built at a cost of slightly over one hundred dollars. Drive is through the reverse gear and four different lengths of shaft care for the different types of engines. The front engine arms are bolted to an angle plate 6 x 12, having three 1 x 3 inch slots on one side for attaching to frame, and other side of plate has three holes for bolting engine arm.





Dimensional Data of Gasket Cabinet and Racks Which Are Easily Constructed

Gaskets Are Stocked in a Special Cabinet That Avoids the Possibility of Curling, and Saves Stock Room and the Mechanic's Time in Handling.

who might spell the tool man and who would have to hunt for the tool if disposed of in the conventional manner, on the wali or a shelf. Being close to the window saves time.

Gasket Racks Save Time

Another efficient arrangement devised by Mr. Hamilton, who is responsible for the bins, cabinets, etc., is a gasket cabinet. Instead of tying a bunch of gaskets together by a string or cord or hanging them on a nail where certain types curl out of shape, each type of gasket is laid flat in a drawer with pins through its holes. This not only keeps the gaskets clean, but saves time for the stock room man and the mechanic. Many times a repairman in attaching a timing gear case gasket is obliged to use shellac or bolts, or both, to hold it in place before he can attach the case.

Where space is limited in the service station and the repair shop is departmentized and the policy is to keep outsiders from entering, the sliding door arrangement in use at the Federal service station can be adopted. Three doors, constructed of a framework of wood, covered with ½ in. wire screen, slide by one another, making it possible to shunt a truck into either the engine department or main repair room, and the engine room is separated from the main repair shop by similar dors. If a driver leaves a truck in the center of the room (entrance) or at either side, the position of the doors can be changed and the truck run in without the usual maneuvers.

The Enclosure of Parts and Tool Room is by Wire Mesh on Wood Frames
Mechanics obtain parts, etc., at rear. Counters over which parts are passed are covered with sheet iron

The Service Policy

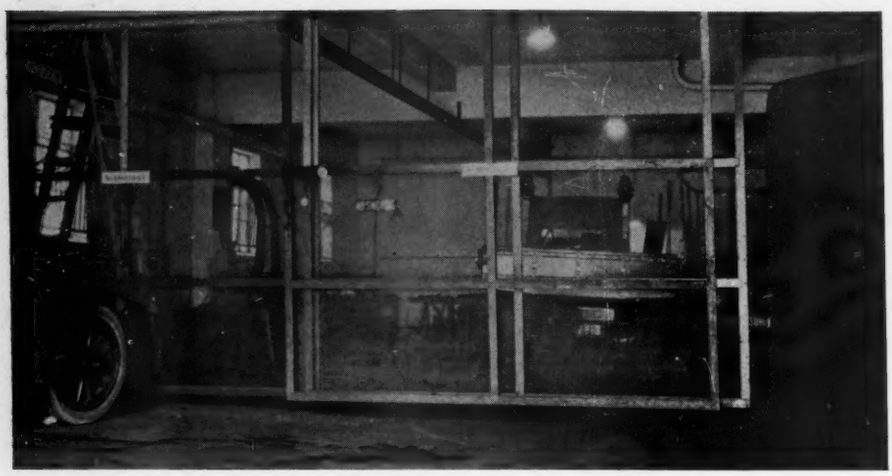
The service policy is that of the Federal Motor Truck Company and a copy is supplied each purchaser of a Federal truck. In it it is stated that "service is maintained for the purpose of giving Federal owners and operators the assistance necessary to secure maximum service from their Federal equipment at minimum cost." Their policy is as follows:

1—Upon delivery to service station at specified times, the truck will be inspected monthly free of charge during first year and minor adjustments made where necessary. Time of each inspection not to exceed three hours.

2—Owners desiring inspection away from service station may secure same attention as above with exception of the charge for transportation and time in excess of three hours.

3—Repairs found necessary by inspector should be ordered by customer and charged at the regular rates.

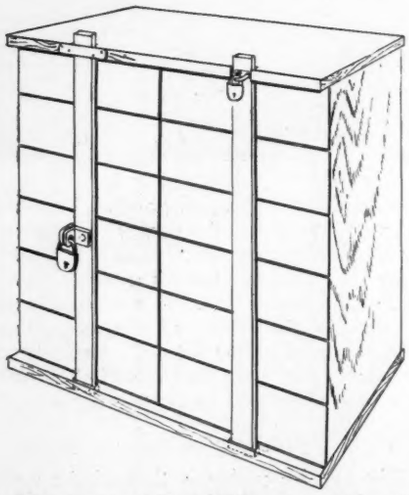
4—Upon delivery to service station, all adjustments for one month not caused by abuse, neglect, overloading, overspeeding, accident or tampering, will be made



Illustrating How the Sliding Doors Are Employed

free of charge. After first month all such work will be charged for at regular rates, except inspection mentioned above and installation of replaced parts as provided for below.

5—Installation of parts replaced as defective by Federal Motor Truck Company



The Jack and Tools of Each New Truck Are Stored in a Locker

or ourselves under standard warranty will be made without charge during first 90 days after delivery. Such work to be done at service station unless customer agrees to a charge for all expenses connected with work performed away from service station.

6—Competent instruction will be given purchaser of new truck in accordance with written agreement at time of purchase.

7—All inspection, adjustments or material furnished will be charged for at regular rates except as provided in paragraph No. 1.

Copy of report sent Federal Motor Truck Company by inspector will be furnished by owner.

Salesmen Co-operate

This policy is executed by the branch and by the salesmen; that is, Manager Locke sees that each salesman properly defines the Federal service policy to a prospect or a customer. Inasmuch as the sales and show rooms are under one roof much of the "passing the buck" to the service manager is eliminated, for the salesmen have an opportunity to realize that the service manager has a few problems of his own. And the manager or chief executive becomes better acquainted with the problems of the service department. Having the chief on the ground has another advantage and that is the adjustment of "delicate" credits, where tact and diplomacy are required.

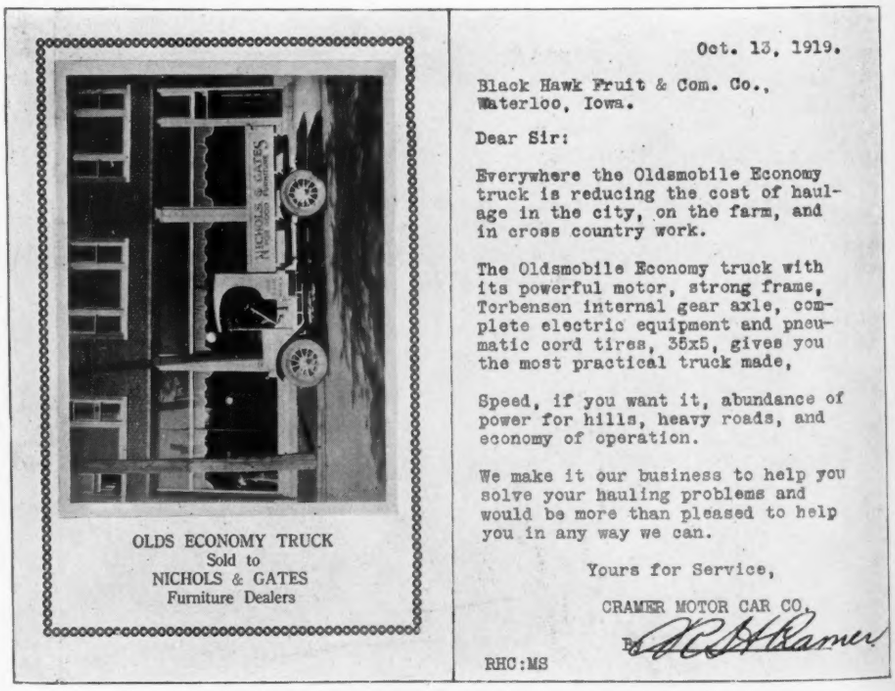
Effort is being made to develop high grade mechanics, specialists on different units, and the separation of the engine department from the balance of the repair shop is an initial step. Effort in the shop is also directed to reducing to a minimum the idle time of the truck and the plan of having service engines has been adopted with considerable success. The ability to have his engine overhauled without losing the services of the truck appeals to many owners, and the charge is very nominal. Statement is made that the plan encourages an owner to have needed repairs made which many times are neglected because the car cannot be spared. This in itself may be considered a service angle. In the matter of inspection, service wagons, letters of instruction to operators and owners, follow-ups, etc., the methods of the company do not vary from conventional.

Show Room is Attractive

There are a number of interesting minor details in the service station of the Federal Motor Truck Company of New York, and one of these has to do with the partitioning of the show room from that where stock chassis are stored. The plan of the sliding door is utilized, which is essential, and a neat and attractive partition was constructed of composition boards painted white and attaching black walnut strips to form panels. The same method exists in the show room proper.

Another kink installed by Mr. Hamilton, although not exactly new, is the construction of a cabinet in the chassis room. All tools, jacks, etc., are taken from each chassis when it arrives and placed in a drawer in this cabinet. On the drawer is marked the chassis number, etc. When a chassis is sold the equipment is instantly available and having been locked up, there is no opportunity for "borrowing" a needed wrench or other tool.

If you are interested in frame sizes, see replacement tables in this issue—a monthly feature



OLDS ECONOMY TRUCK
Sold to
NICHOLS & GATES
Furniture Dealers

Oct. 13, 1919.

Black Hawk Fruit & Com. Co.,
Waterloo, Iowa.

Dear Sir:

Everywhere the Oldsmobile Economy truck is reducing the cost of haulage in the city, on the farm, and in cross country work.

The Oldsmobile Economy truck with its powerful motor, strong frame, Torbensen internal gear axle, complete electric equipment and pneumatic cord tires, 35x5, gives you the most practical truck made,

Speed, if you want it, abundance of power for hills, heavy roads, and economy of operation.

We make it our business to help you solve your hauling problems and would be more than pleased to help you in any way we can.

Yours for Service,

CRAMER MOTOR CAR CO.

By R. C. Hamer

RHC:MS

A Nifty Little Folder Which Has Proven a Good Selling Help
The Cramer Motor Car Company, of Waterloo, Iowa, finds this folder of great benefit. An actual photograph helps to make the folder exceedingly attractive

EFFICIENT REPAIR METHODS

Editor's Note: This department is conducted primarily for the new repairman and dealer; also the repairman in the smaller towns who is anxious to place his shop on a better paying basis and do his work in a more systematic manner. We shall appreciate any suggestions or criticism that will help us make this department satisfy your needs. Hereafter, this department will be included under the general department head of "Service and Repair Departments."

Repairing and Adjusting Timken-Detroit Axles

By C. P. SHATTUCK

THE following are the methods employed by the Timken-Detroit Axle Co., Detroit, for repairing, assembling, adjusting and lubricating its No. 6552 Timken-Detroit worm drive axle, of 1½- and 2-ton capacity, which axle is constructed with a one-piece housing and has 18 in. diam. Duplex brakes. This axle supersedes No. 6551, which is of similar capacity and is built with a three-piece housing and with Duplex brakes 16 in. in diam. The early types of axles produced by this company while differing in detail embody the fundamental principles of the modern types so that the general instructions for the No. 6552 will apply.

The Timken axle No. 6552 is simple and adjustments necessary because of wear or neglect can be made by the average mechanic of the truck dealer provided the former has a proper knowledge of the correct steps to take to bring the cups and cones (Timken roller bearings) into the same relative positions as when the axle was assembled at the factory. Replacement of the worm wheel, worm shaft, differential components, rebabbitting of brake camshaft, relining and adjusting brakes, etc., is work that also can be performed by the repairman.

Removing Differential Carrier

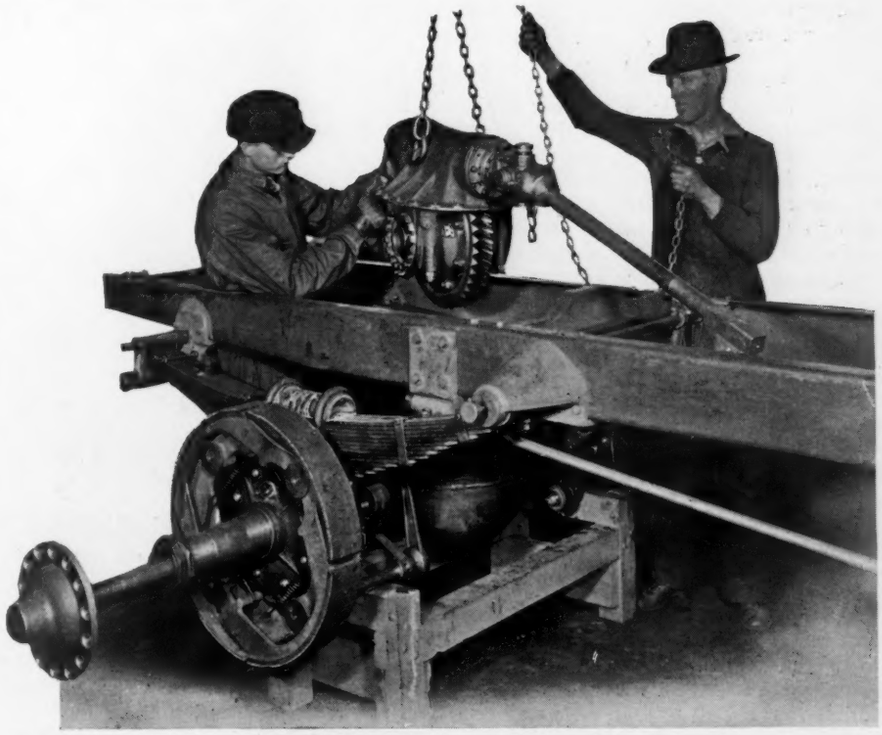
In the instructions contained herein the factory term and number for part are used. Assuming that the axle is to be entirely disassembled the first step is to **jack up and suspend the rear axle** so that wheels clear the floor. **Remove axle shafts and wheels.** The next step is the removal of the differential carrier, the unit comprising the worm shaft complete, worm wheel, differential bearings, etc. To obtain access to this unit it will be essential to either remove the body or displace the axle unless a door be cut in the floor of the body directly over the carrier. Statement is made by the company that it is entirely practical for body builders to incorporate such a door in their design without impairing the practicability of the body.

Displace the 16 carrier screws (X1006) **and their washers** (X531) and endeavor to preserve the housing and carrier gaskets (T6162). Attach chain hoist, as shown in the accompanying illustration, **lift carrier** and swing to bench or stand. **Displace propeller shaft** and universal joint if attached.

Mark Differential Bearing Caps

With worm wheel uppermost **displace two long locking wires** (T3589), **adjusting ring lock cotters** (X825), **lock springs** (T6163), **lock pins** (X1230) **and locks** (T5510). Before removing the differential bearing cap screws, which retain the differential bearing caps, prick punch the caps so that they will be replaced in the same relative assembly. This is very important. **Remove four differential bearing cap screws** (X986), **four washers** (X532) **and bearing caps** (T6499). **Displace adjusting rings** (T5267), **bearing cups and cones** (552 and 559). **Lift differential complete** (T3508) from carrier (T6161).

Assuming that worm wheel is to be replaced with new. **Remove the eight rear bolt nuts** (T6531) **and bolts** (T6532), or, if of the riveted type, as will be described later, remove rivets. The differential case is in two sections or halves, male (T4778) and female (T4779), and contains a differential spider (T4782), two side gears (T4781) and four side pinions (T4780). Clean all parts, old or new, before reassembly and thoroughly lubricate gears and pinions before replacing.

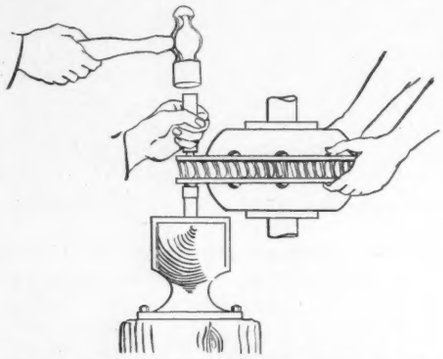


Illustrating Method of Removing Differential Carrier From Timken-Detroit Worm-Drive Axle, Also Brake Assembly With Springs

Disassembling Worm Shaft

In the event the worm shaft is to be replaced proceed as follows: **Remove worm shaft forward bearing packing gland** (T3544) which screws in, and packing (X1262). **Displace six screws** (X646) **and washers** (X530) securing rear bearing cover (T6030). **Remove cover.** Try and preserve gasket (T6031). **Remove forward bearing clamp bolt nut** (X518), **washer** (X533), **bearing clamp bolt** (X575) **and lock** (T4426). **Unscrew and remove worm shaft forward bearing adjusting ring** (T4425).

The worm shaft is carried in two Timken roller bearings and these are pressed on at the factory. To remove use a lead or rawhide hammer. To reassemble the worm shaft assembly reverse the operations described. To adjust worm shaft bearings turn adjusting ring until bearings are tight, then slack off two notches. A slight amount of end play is permissible as it is taken up when the truck is



Showing How Differential Cases (Two) and Worm Wheel Are Best Rivetted Where Elongation of Bolt Holes Occur

in operation. The end play, however, should not exceed .015 in. The packing gland should be set up fairly tight and always use new packing.

Replacing Worm Wheel

Before beginning the reassembly of the differential carrier clean and dry worm wheel. This is essential to the adjusting process. **Replace bearings on differential and set in carrier. Insert differential bearing adjusting rings,** taking care to see that these thread properly and that worm wheel centers. **Replace bearing caps** and make sure that they are fitted according to the prick punch marks or in the same position as originally assembled. **Replace bearing cap screw with washers.** Next **set up bearing rings flush** but not tight. If set up tight they will lock in the bearing caps which are not locked; that is, the cap screws are not set up tight. They should be sufficiently loose to permit adjustment of the worm wheel in relation to the worm.

Adjusting Worm Wheel

Smear three or four of the teeth of the worm wheel with mechanic's blue. Rotate the wheel and note the high spots as you would in fitting a bearing. If the color shows to the left of worm wheel the adjustment should be changed to carry the worm wheel to the left. Similarly, if the blue shows on right, adjust the worm wheel to the right. In making this adjustment at the factory the mechanic lightly taps with a hammer the differential housing or case to seat it. Care should be exercised not to strike the bearings. Adjust until the color shows in the center. A worm wheel that has been in use for some time will be easy to adjust as the color will extend practically the length of the tooth. **With wheel centered adjust bearings. Set up tight, then back off adjusting ring two notches.** Tap housing lightly to seat. **Tighten cap screws, replace lock, pin, spring and locking wires.**

Note.—When replacing worm wheel with a new one, adjust ring two notches off center on the right side when facing the propeller shaft end of differential carrier.

Rebabbitting Brake Camshafts

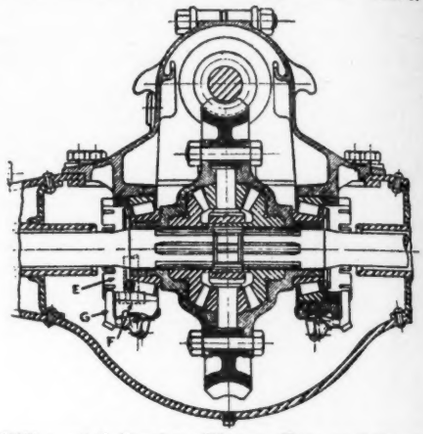
Attention should be given to the brakes, their lining, adjustment of camshaft levers and wear of the bearings of the camshafts. The last named operate in babbitt bearings and if lubrication has been neglected wear will result and the play should be corrected.

Illustrating Correct Method of Adjusting Bearing Caps

To remove camshaft levers, which will be essential if they are worn oval at their bearing seats, **remove camshaft lever bolt nuts (4), washers, inner and outer (4); bolts (4), spacing springs (4) and levers. Remove** camshafts and if these be worn oval grind or true in lathe. Replace camshafts in their brackets and rebabbitt, pouring through the openings provided for this purpose in brackets. Use any high grade babbitt. **Reassemble levers.**

Brake Spring Removing Tool

Reline or renew brake lining whenever material shows wear of ⅛ in. or more.



Differential Carrier, Worm, Etc., and Components Used in Adjustment
"E" Adjusting Ring; "G" Adjusting Ring Lock; "F" Cap Screws

The lining is attached to two single and two double legs for each brake; therefore four linings are required. There are 32 rivets used for each brake and four brake springs. For both brakes double the lining and number of rivets.

The brake springs employed are exceedingly stiff and their removal and replacement will be accelerated by use of a special tool. That used at the Timken-Detroit factory can be made easily by taking a piece of ⅝ in. round stock about 26 in. long and bending one end to an L shape, allowing about 2½ in. for the bend. Taper the other end to a point.

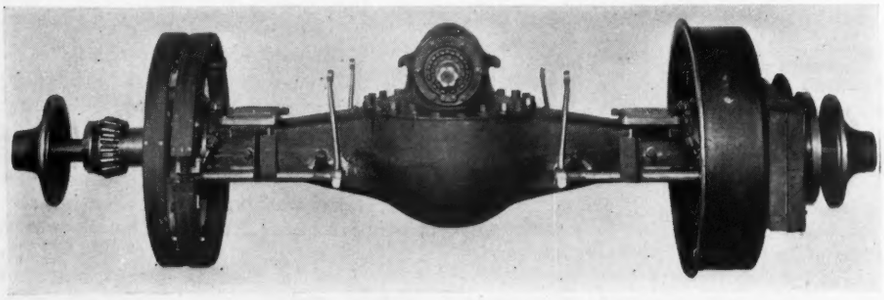
Displacing Brake-Shoe Springs

To use tool employ the housing tube of axle as a fulcrum. **Slip point of tool in eye of spring** and use tool as a lever. **Expand spring until eye clears lug.** Remove all eight springs, four to each brake. In replacing springs it may be advisable to run a wire around the periphery of the shoes to hold them in place, although this is not done at the factory when the workman performs the operation of replacing four springs in three minutes.

Brake lining in sections for the different capacity axles is supplied by the manufacturer but the sections may be made up by the repairman if desired. The following are the sizes utilized on the Timken-Detroit axles:

Axle Cap'y Tons	Parts Number	Thickness, in.	Width, in.	Length, in.
*¾	.....	3-16	2	10
1	R5491	¼	3¼	11¾
1½	R5173	¼	3½	13 3-16
2	R5173	¼	3½	13 3-16
3½	R6065	¼	3½	13 3-16
5	R5652	¼	4	17 15-16

* Obsolete model.



Attention Should be Given to the Bearings of the Brake Camshaft Levers. Rebabbitting of Bearings and Trueing Shafts May be Necessary in the Overhaul of the Axle

Three-Piece Housing Axles

Timken-Detroit axles Nos. 6550-6551, used in trucks of 1916 construction, are of the three-piece housing type and were made with Duplex brakes on the 6551 and double brakes on 6550. These have six-spline axle shafts. In replacing these shafts it is important that the shafts with bearings do not extend too far in the differential else the latter may lock. Equalize the adjustment; that is, see that the distance between the outer shaft end and some fixed point on the housing is the same.

Elongation of Bolt Holes

In the newer type of axles use is made of hot rivets in the assembly of the worm wheel and differential case; that is, the male and female differential cases with spider, gears and pinions are riveted to the worm wheel. This construction differs from the older type of axles which have the differential halves secured to the worm wheel with bolts.

After considerable service and when unusual stresses have been imposed on the axle it may be that elongation of the bolt holes of the worm wheel and differential cases may be noted, and if this condition exists it should be corrected. The first step is to remove the bolts and this is done in the conventional manner. It is suggested that before disassembling worm wheel and differential that the differential cases be marked or prick punched and that these marks be utilized for reassembly and to insure alignment of the holes after the reaming operation. The proper size reamer to use will depend upon the size of the hole.

The replacement of the rivets, which are heated and will take care of a hole 1-16 in. larger than the rivet, can be performed by the blacksmith. To rivet place an arbor in a vertical position in the anvil, as shown in an accompanying illustration. In the reassembly care should be taken to avoid the possibility of metal chips, etc., lodging in the side and pinion gear assembly which should, of course, be well lubricated in the assembly work.

Cleaning and Adjusting Bearings

Too much emphasis cannot be laid upon the necessity of thoroughly cleaning the Timken roller bearings after removal from an axle and proper lubrication when replacing. Clean thoroughly in kerosene. Bearings in the wheels should be packed in a light, high grade grease, one free from acid or grit. In replacing fill the hub full. Examination, adjustment and lubrication of these bearings should be made at least every 5000 miles of service. The company recommends use of 600W gear oil for the lubrication of the worm wheel and worm, filling the housing until the oil overflows the filler opening. In cold weather use about a pint of kerosene to each gallon of lubricant.

If after an axle overhauled and placed in service leaks oil at the forward end of the worm shaft at the packing gland the remedy is to tighten the gland nut slightly.

Statement is made by the company that axles damaged by accidents, etc., have been scrapped by the dealer when credits could have been obtained by sending same to the truck manufacturer. It is pointed out that the majority of the units could be salvaged and others replaced, thereby obtaining a serviceable unit at considerably less cost to the owner than he would obtain by the repairman attempting to reconstruct, etc.

The Planning of a Drive-in Filling Station

By F. A. BEAN, Consulting Engineer Wayne Oil Tank & Pump Company

IT appears at first thought that this field is fairly well covered. However, there are still a great many excellent opportunities in the large cities and hundreds of the smaller places which are without a filling station of any type. It must also be remembered and taken well into account that the field is continually broadening, due to the ever increasing number of trucks and passenger automobiles and the corresponding increase in the sale of gasoline and lubricating oils for their operation.

In this, as well as in every other line of industry, a large number of the stations have proven to be exceptionally good paying investments, while others have turned out to be flat failures. In each and every case there is a well defined reason for the success or failure of a station. A small proportion of the failures is the result of mismanagement in operation, but a careful analysis of all of the stations examined, reveals the fact that in a majority of cases they were not properly planned at the outset.

It is therefore perfectly safe to say that the success of any station, expressed in terms of dollars and cents, is dependent on its being so planned as to attract and efficiently hold and serve a maximum gallonage at a minimum cost of operation and maintenance. To this, of course, must be added the exercising of a sound business judgment in its management.

The embryo operator (and in some cases the old timer as well) in his efforts to spread his small wealth into as much station material as possible, is likely to overlook a number of important details which seem innocent in themselves but which have a peculiar way of piling up, and at the grand reckoning of cost and result, assume mountainous proportions.

Must Cater to the Public

There is one thought that must always be well kept in mind and that is the operation of a filling station makes you, in a certain degree, a public service corporation and in order to successfully serve a large and extremely critical automobile public, it will be necessary for you to make your ideas and whims, in a proportionate degree, subservient to theirs. I do not mean by this that you are to allow the motor public to dictate your business policy or manage your business entirely. Use a little applied psychology. Let them believe they are doing it.

In order to produce a successful station the local conditions under which it is to be operated should be carefully studied and the station building and its surrounding layout designed to meet these requirements, as no one station or single combination of ideas can be expected to serve all sorts of service and conditions.

A refinement, not possible in the investigation, is the working out of all factors for readily judging how closely any particular station approaches the ideal. Much can be done, however, with the data available by a comparison of the future in relation to the chief factors affecting sales, which are—population and its density, per capita car ownership of the district, size and location of the lot. arrangement of drives, type of building, class and distribution of the equipment, general appearance, operating methods, present and probable future competition.

Statistics which have been compiled by some of the larger companies are not only interesting, but are well worth serious study. A report recently made public by the National Automobile Chamber of Commerce gives the number of cars of all types now in use as 5,945,422. This makes approximately one automobile to each twenty inhabitants of the United States.

Using the law of averages, based on mileage, a station located in a town of 1000 inhabitants and controlling one-half of the gasoline (on a two-cent margin) and lubricating oil used by the automobiles in the town, should pay a net profit of eight per cent. on the original investment of four thousand dollars and which takes into account, interest on capital investment, all operating and maintenance charges, depreciation, etc.

This is a safe minimum earning rate for towns of this class and similar deductions can readily be made for towns and cities of larger populations by a careful study of the factors entering into that particular locality.

General Location

The records of one company prove quite conclusively that the station located

in a fairly well settled residence district where practically every house, for a radius of ten or twelve blocks from the station, owns a car and keeps such car in their private garage instead of a public garage, is a better paying station as far as daily average sales is concerned than the station which is located in the heart of the business district on a heavily traveled highway or boulevard, where practically all of the sales are of a transient nature. In other words, the station located where community purchases are certain is practically assured success.

I have in mind one station located in a district similar to that described above and inhabited by the so-called middle class, owning medium or low priced cars, which were in daily use the year round for business or pleasure, and which had 532 regular customers who came on an average of three times a week, six months after the station was opened for business, and all lived within a radius of eight blocks of the station and constituted over 85 per cent. of the cars in that territory. Transients very seldom drove into this station. Of course, stations of this type are subject to rush periods and provision must be made to care for the rush in the way of extra pumps, large roomy drives and ample attendance.

At another station located on one of the prominent boulevards in Chicago, where every day in the year, between the hours of eight in morning and ten o'clock at night, over 600 cars passed the station every hour, and it was found that only about two per cent. of them drove in. It was also ascertained that only occasionally the same car came more often than once a week.

Now do not be misled and think that the station last described does not pay. It does. Hundreds like it are paying splendid returns on the investment. These cases have been cited simply for the sake of comparison and the comparisons are good averages.

When locating on a boulevard or rather heavy traffic highway, care should be taken to get on the side of the burden of traffic, particularly if the station is all hidden from approaching cars. Comparatively few drivers will cross the street through heavy traffic in order to get into a filling station unless it is a case of necessity.

Stations located in the center of business districts are in a class similar to those on the boulevards, unless they are located near or adjacent to a large public parking space or on a lot large enough to provide such parking space. Under these circumstances they may become something of a community purchasing point. Stations located near amusement or public parks, ball parks, or at the outskirts of towns or resorts of any nature, or on tourists' highways, cannot expect to have a good daily average of sales as a general thing, but will be subject to peak load periods and then dwindle to periods of practically nothing.

Stations located on prominent streets near the approach to large railway stations or near the approach of a well traveled bridge, usually command a good business, better than those located near large theaters or hotels.

Stations catering to trucks should be easy of access immediately before they pick up their loads or immediately after they have discharged them. **They will seldom pay if located along the route of the loaded trucks.**

Selection of the Lot

After having decided that any particular locality will produce enough business to make a station a paying proposition, the next step is the choice of a lot.

Corner lots are always more desirable than inside lots. They are almost absolutely essential on boulevards and other places of congested traffic in order that trucks and cars may get in and out quickly. Another strong point in their favor is that they are very seldom shut in from view and can be seen by approaching cars for several hundred feet.

Corner lots are also susceptible to a better driveway arrangement for the rapid handling of business during the rush hour periods, if they are of reasonably good size.

Inside lots can be used to good advantage in residence and business districts if of sufficient size so as to allow a proper driveway arrangement. Keep away as much as possible from narrow or unpaved streets or streets on which street cars or other tracks are located.

One city of about 500,000 recently denied permits to build several filling stations, giving the reason that the locations were on streets through which trolley lines operated and were so narrow as to greatly increase the liability of accidents.

The Board of Safety of one city has held that there should be at least eighteen feet between the nearest car rail and curb to allow machines to turn in and out of private property without danger.

Avoid lots that are more than four feet above the level of the street or that are located on or at the foot of a steep grade. Triangular lots when not too narrow usually make very good station sites.

In casting about for locations, don't confine yourself to vacant property. It often occurs that existing structures can be razed at a small expense and a very desirable location thus secured.

Size of the Lot

The size of the lot is always a question. It depends largely on what can be secured. The price asked, and the number of cars that must be served. I would strongly urge to refrain from entering a locality the property of which is not large enough to properly build on and not adequate for successful operation.

Perhaps the simplest method would be to give the minimum size of a few lots which have been found to work out to good advantage. Inside lots facing on one street only should have a frontage of at least 100 ft. and a depth of 50 ft.

Inside lots, with a frontage on two streets (that is, running clear through the block), should have a minimum width of 50 ft. Stations located on this class of a lot very seldom become large steady gallonage stations unless situated so that they are not obstructed from view by buildings on either side or can be made community purchase points.

Corner lots for small gallonage stations (500 to 600 gal. per day) should have a minimum of 50 ft. frontage on each street, providing the streets are fairly wide and without street car tracks. Where stations are doing a larger business, these frontages should range from 80 to 100 ft., especially where traffic is heavy or inclined to become congested. These dimensions are for stations handling gasoline and lubricating oil only. If tires or other accessories are to be handled, at least 20 ft. should be added to the width in every case.

When triangular lots are used they should be at least 100 ft. in depth by 50 ft. across the back. These are all minimum dimensions and can usually be greatly increased to good advantage.

Leases

Some oil companies will build stations only where they own the property. It certainly does not pay to build on a lot where the lease is less than five years, although some of the larger companies attempt it on a three year lease. You can salvage practically nothing from the cost of the building (except the portable type), piping, driveways, landscape improvements, etc., and you cannot afford to build in a manner permanent enough to attract and serve a maximum gallonage and then send practically all of it to the scrap heap at the expiration of two or three years.

In a locality where the prospects look reasonably good, it is the best policy to secure a five or ten year lease, with a privilege of renewal and an option to buy.

There are two other clauses that should be incorporated in the lease. The first is that the building and all other improvements are the property of the lessee and may be removed at the expiration of the lease.

The second, that in the event of any existing or future city ordinances, county or state legislation or court decisions, which make the property inoperative for filling station use, then the lease shall terminate and become null and void at the option of, and without liability for, damages on the part of the lessee.

Position of the Building on the Lot

Surrounding conditions and the proposed method of operation must be carefully studied. The position of the building is dependent on the size and shape of the lot, obstructions to driveway entrances, the width of the streets, grade of streets and lot, whether there are street car tracks or not, and if on a corner, which street carries the burden of traffic.

Buildings placed in or near the center of the lot and without covered driveways, so that cars can be served on all sides are susceptible to handling more cars and handling them more rapidly and more efficiently than when the building is placed close to a lot line.

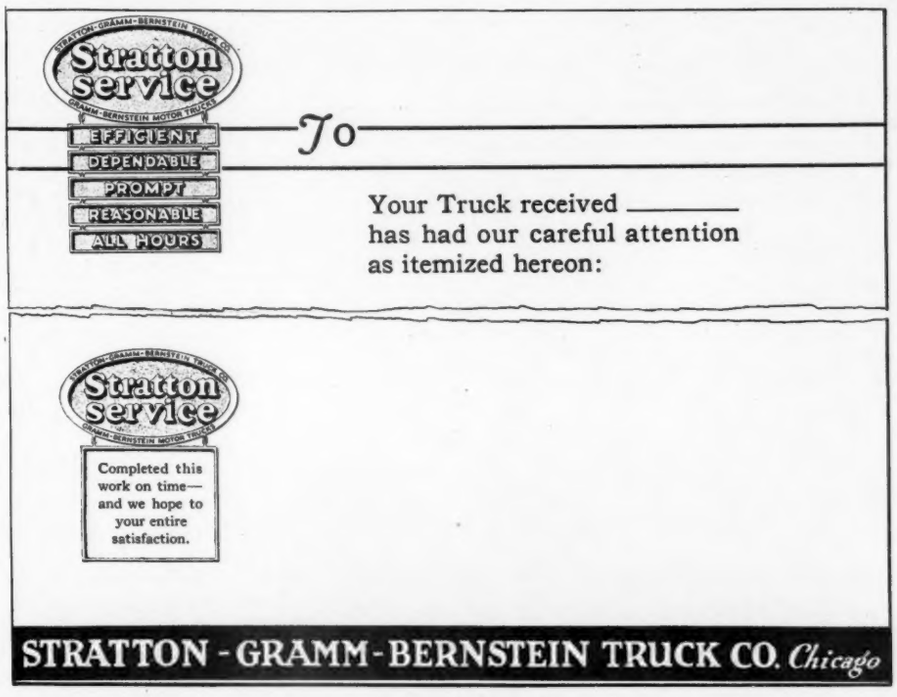
Triplicate Letter System Found Effective in the Service Department

Second-Hand Cars Accepted Only on the Basis of Junk Value on Trade-in

MEN who sell motor trucks or other power vehicles must give service. This is a business axiom which is universally conceded if success is to be assured. It is vital in building up trade and holding patrons.

Worthy of the attention of every dealer is the method of service adopted by the Stratton-Gramm-Bernstein Truck Co., 2590 Michigan Ave., Chicago—the "Stratton Service." When a truck is turned in for service or overhauling, the inspector of the service department, after making an investigation, turns in to the bookkeeper his report and a triplicate letter is written for the information of the owner. The first letter is mailed upon the day that the inspector's report is filed. The second letter, containing the same itemized information as the first, is mailed the day that the job is completed, announcing that the truck is ready for use. Thirty days after the second letter is forwarded, the third and last of the triplicate letters is mailed, merely as a reminder to the owner. The chances are that the owner has not paid much attention to the performance of the truck following its return. He will usually be appreciative of the reminder and will hasten to find out if the job was satisfactory and if not, why not? He may also be reminded that service for other machines may be needed and he will be apt to send in some new business. By making carbon copies of the three letters, the work for the bookkeeper is kept at the minimum.

With the Stratton service inspection only is free after the usual ninety days following the sale. Patrons are urged to send in their trucks at least once a month for inspection. This periodical supervision tends to promote reliability and lessen the expense of upkeep. Delay in inspection sometimes proves costly to the truck owner. According to A. M. Pierce, secretary-treasurer, second-hand trucks should be taken in as part payment upon new trucks, only upon the basis of junk value. Truck dealers are finding it difficult to place new machines to displace those worn out, unless a large allowance is made for the old. This is an evil that is threatening the truck industry and which must be guarded against through organization. The truck dealers should get together and agree not to take used trucks except upon the basis of junk. There may be exceptions to this policy in the case of a fleet owner, where it is worth something to a truck manufacturer to have it known that So and So, who operates fifty to a hundred or more trucks, has taken on the line handled, and he may be justified in sacrificing the usual profit or commission in order to secure representation in the big fleet. It is business suicide, according to Pierce, to maintain such a policy with the small truck consumer and should be avoided at all hazards.



The Object of the Triplicate is to Call the Attention of the Owner to the Performance of the Truck, Following Its Return

The Stratton plant in Chicago has facilities for rebuilding trucks and the repair shop is one of the most complete of the kind in Chicago. The used Gramm-Bernstein trucks taken in on new machines are the only kind overhauled and rebuilt. Used trucks of other makes are sold just as they are. The Chicago agency on Michigan Ave. carries $75,000 worth of parts constantly on hand. The present plant is only temporary. A tract of land has been acquired on Wabash Ave., between 25th and 26th Sts., upon which a plant will be erected during the coming fall and winter to cost $200,000. It will be one of the most complete sales agency and service stations in the Middle West. A three-story building will be erected. Plans have been approved, the contract let and work will be pushed. It is hoped to have the structure completed early in 1920.

Franklin to Build Truck

SYRACUSE, N. Y., Nov. 12—The H. H. Franklin Manufacturing Company is about to enter the truck field and is planning to produce a 1-ton truck, the design of which is in charge of James Yarian, who has been named general manager and engineer in charge of the truck manufacturing department. Mr. Yarian plans to construct a new factory with 20,000 sq. ft. of floor space which will be devoted to experimentation and research work in the interest of the truck. The new truck will include all the well known features of the Franklin car, including the air cooled engine.

A. Schrader's Sons have just been handed a decision by the U. S. District Court of Ohio which should be of importance to all manufacturers of widely advertised products. The company had been indicted by the Federal Grand Jury on the ground of several contracts, made by them with tire maker and jobber. These contracts fixed the price at which the tire maker might sell to the jobber, retailer and consumer, and the jobber might sell to the retailer and consumer, and were claimed to be in violation of the Sherman Anti-Trust Act. The Court claimed that the manufacturer has a perfect right to refuse to deal with anyone who does not maintain the prices indicated by him, even when the effect of this may be, in some cases, to put the dealer out of business. The company manufactures tire valves, pressure gages and other accessories relating to tires.

Need of More Highly Trained Mechanics, Says Service Expert

By RALPH C. ROGNON

AS yet, the Service Department is not established on a commercial basis, especially if we compare the product of our department with that of other lines. On the shoulders of the Service Department rests the responsibility and obligations created by the sale and delivery of the automotive vehicle. The reputation of the industry's product depends on its proper servicing. The co-operation of the manufacturer and dealer in assisting the Service Department to keep up with the rapid progress of other branches of our industry is imperative for two reasons.

1. So that the manufacturer can increase production and the dealers sell more cars, thus stimulating profits;

2. So that the automotive industry as a whole may enjoy the prestige that it has in the commercial world on sheer merit.

Service is Built on Shaky Foundation

Since the inception of the automobile industry the Service Department has been a bumper between the owner on the one hand and the dealer and his sales force on the other. Complaints, criticism of the design, construction and operation of the car are shunted to the Service Department. The Service head must not only satisfy the customer, impossible many times, but must execute the policies of the manufacturer and observe those of his employer.

During the experimental stage of the industry the product was misrepresented in order to sell it, and Service was misrepresented because we were experimenting instead of efficiently repairing. Free service was resorted to by way of atonement, with poor results.

Service is Merchandise

The purpose of a Service Station is to stock adequate repair parts, maintain proper facilities and equipment for making necessary repairs, due to accidents or breakdowns; completely rebuild cars at the proper mileage interval; install checking system of upkeep as to proper lubrication and adjustment, based and charged for on mileage; install an efficient system of inspection as to exact condition of cars, and to adjust all complaints.

The principal object is to get the owner's vehicle back on the road in a dependable condition, and at the least possible cost to the owner. One of the biggest handicaps in merchandising Service is that the owners look upon the Service Department as an Adjusting Department. Considerable time is lost and expense involved in making adjustments. By adjustments I mean credits and convincing the owner that Service does not mean free replacement. I might cite any number of specific cases where the overhead is increased because of the time required to adjust the owner's mental balance. This condition has resulted in the owner becoming a frequent visitor to the Service Station during the warranty period, and thereafter only when absolutely necessary.

We need assistance from every possible source in educating the owner as to the difference between Adjustment and Service. The Adjustment Department of a Service Station should be maintained as a separate department, and through it should be determined as to whether or not the expense of repairs is to be carried by the owner, dealer or manufacturer. The principal object of a Service Station should be to produce repairing promptly and efficiently, at the least possible cost to the owner, and at a fair profit.

Ralph C. Rognon

Mr. Rognon is president and founder of the Automotive Service Association of New York. He has made an extensive study of service conditions in various parts of the country, and is service superintendent of a factory branch of a well-known company.

The Development of Skilled Craftsmen Biggest Problem

The automotive mechanic must first learn to be neat and clean. This will produce accuracy. Thought and study will produce skill, and these qualifications will automatically develop speed because of the interest he will naturally take in his work under these conditions. Educational facilities have not gone very much further than teaching theory and construction, whereas he must learn to develop a very high degree of mechanical skill in actually performing the different labor operations completing a job. Our skilled craftsmen should have some training as a machinist, must know the fundamental principles of electrical engineering, the principles of construction and peculiarities of the internal combustion engine, and must also develop a very high degree of mechanical instinct and hand dexterity. The largest percentage of mechanics working at our Service Stations are not skilled craftsmen. In fact, the percentage of unskilled men is so large that we cannot get along without them, and must educate the majority and recognize the minority.

At the present state of affairs our skilled mechanics have no means of recognition, and there is very little incentive for them to produce. On the other hand, there seems to be very little necessity for the lesser skilled men to study. This condition has produced a deadlock. The experienced mechanic is naturally jealous of his knowledge when forced to work on the same level as the lesser skilled man, whereas he should be his understudy's best means of education. If we would classify our mechanics by examination, both written and oral, before a board of local Service Men, recognizing our skilled craftsmen and pointing out the course of study that the others should pursue, we might eliminate this feeling of jealousy that exists and substitute co-operation. If we gain our point we have solved our best means of education, for books and schools are necessary to teach theory and construction which a mechanic must have in order to gain confidence, but instinct and skill, so vitally necessary to our mechanical producers, can only be developed in our shops under proper supervision and co-operation of the men between themselves.

Some of our most experienced skilled craftsmen do not realize that we must commercialize repairing. They are accurate but slow, and have guarded their knowledge with the shroud of mystery. Our repair work is gradually coming to a matter of production, although in most cases we are still allowing our men to follow their own plans in completing a job. The most thorough means of education is the direct way, or by suggestion, which is really indirect reasoning. In our Service Stations our biggest enemy to production is lost motion, which we must overcome by suggestion. System and short cuts in repairings must be developed, outlining the most efficient plan possible for our men to follow instead of allowing them to outline their own. Practical mechanical manuals, outlining the best methods to use in repairing, taking each unit as a series, with a certain number of operations under each

series. Listing all special tools, short cuts and with a generous supply of photographs and sketches, together with a maximum time limit on each operation are badly needed.

Aside from this educational program there is another subject we should discuss while on this question of mechanics. If we are to successfully commercialize Service, we must cut down on the already exorbitant overhead with which we are burdened. One of the largest factors in our overhead is supervision, a rigid system of which must be maintained in order to overcome the inefficiency of our mechanical producers. The question involved is, after developing our craftsmen, how can we create an incentive for them to produce?

One of the biggest disappointments to a service head is to lose one of his best mechanics after developing him at considerable expense covering a period of several years.

The ambition of men today seems to be to develop executive ability and wear a white collar. This ambition is justified, but, on the other hand there are some that do not possess the personality or ability to become successful in this line. Still, a skilled craftsman in Service work must devote as much energy and study in his development as the average professional man. It is only natural that he should be proud of his craftsmanship, and for us to discourage this pride by lack of recognition, certainly is the adverse of our motives. The condition that exists in the average Service Station is that in order to gain recognition or financial remuneration, our men have to give up their craftsmanship and develop executive ability.

Incentive Must be Created for Our Craftsmen

A diplomat studies the law of human nature. Let us follow one of our craftsmen after leaving his position with the Service Station into his little one-man shop and find out what course he pursues. Were we to follow him the first year, we would find him not only contented, but prosperous. His little shop with several men under his direct supervision is neat and clean. All equipment and tools are easily accessible and in their proper places. He knows that every job that leaves his shop is right and his success so far is based on his reputation. His natural ambition to grow develops him into a business man, and as he grows and branches out he must give up his craftsmanship and develop executive ability. Very seldom can a man develop these two very important qualifications, namely, a thorough business man and a highly skilled craftsman, with the result that the small shop usually ends a sad business career.

The point I am trying to bring out is the one man shop idea. Can we develop it in our larger Service Stations, and instead of allowing our men to work together in one large room, with lack of accommodations for the necessary tools, we should put our best skilled craftsmen in stalls, with several men under their direct supervision, and make efficient mechanical production possible. The workmen can have a sufficient supply of tools and equipment easily accessible without danger of being lost or stolen. Some system can then be used in tearing down a unit; the parts can be cleaned and placed so as to facilitate efficient assembly. All missing and worn parts can be listed while disassembling and procured from the stock room at one time. This private atmosphere, together with a financial incentive, will create a pride in a man's craftsmanship, and certainly increase production without such rigid supervision.

Service and Manufacturing Are Different Industries

In manufacturing the assembling of a vehicle, the parts of which are all clean and accurately machined is handled in such volume that the skilled craftsman can be easily developed by specializing them in one or more operations. Tool making, forging, machining, etc., the largest factor in manufacturing play a small part in Service work. In our Service Stations we require several classes of highly skilled craftsmen that must be skilled in all lines, the volume of one class of work being too small to justify specializing our men only upon a small scale. The conditions under which our craftsmen have to work are perplexing ones. In disassembling we have dirt and rust, fused and riveted metals to contend with. In assembling we have the relation of an old part to a new part to determine, and a thorough knowledge of theory and construction, clearances, specifications and metal in all its ramifications. Diagnosis of trouble of a used car is difficult, and the volume of our repair work is clumsy and awkward to work on from a mechanical standpoint. Because of these reasons we are forced to resort to hand work in many instances, which requires considerable more skill and accuracy on the part of our craftsmen. The factory Service Departments are a big help to the Dealers' Service Departments, especially in the efficient handling of parts; but the method of sale of our product and the development of system and short cuts in practical repairing can be outlined more efficiently by local service men. The Factory Service Department has a thorough knowledge of construction, specifications, clearances, and all engineering data, and a spirit of co-operation between these departments is of vital necessity in the development of Service.

Local Service Associations Big Help

A Service man has always been a sort of a lonesome individual. Manufacturing of automobiles has been greatly assisted by the Society of Automotive Engineers and the National Automobile Chamber of Commerce, and co-operation has been the spirit of nearly every branch of the industry. Service men have been plugging away in a local atmosphere, and in many cases have become discouraged and followed the lines of least resistance.

Several Service Associations have been formed throughout the country, our New York Association being one of them, and the results obtained through interchange of ideas and social intercourse have been wonderful. The amount of good derived from a Service Association as a branch of the Dealers' Association is unlimited. Papers can be discussed outlining systems used in merchandising Service, in handling parts, in accounting and bookkeeping, in handling complaints and many other details that come up in local service work. Lectures and moving pictures can be secured from manufacturers and accessory makers. Through committees the officers and members of these associations can accomplish the following:

1. To promote the welfare and education of employes of the Service Station and assist in promoting social functions for employees.

2. A committee can be formed to examine mechanics of the floating type and act as an employment bureau, making employment easier for employe and employer. All agitators can be listed as unpopular or undesirable.

3. In order to stimulate pride in craftsmanship among mechanics, recognition and prizes can be offered mechanics passing best examination.

4. The membership committee can retrict preparatory memberships to a Service Station or garage that maintain the facilities and ability to render efficient service, in this way eliminating to a certain extent the shyster repair man.

5. Through personal acquaintance with one another, Service Managers can assist one another in many ways. Prompt delivery of parts necessary to rebuild a trade-in is one favor one can extend to the other. Unreasonable complaints made by owners, and in some cases mechanics, as to what the other Service Station's policies are, can be checked up, and there is no limit to the amount of good that can be accomplished from Association work through personal acquaintance.

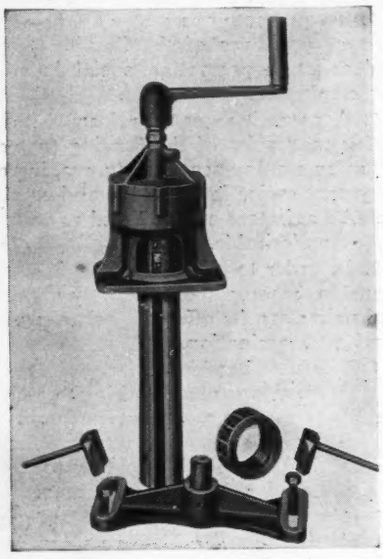
There are so many different angles to the Service problem and the subject is so broad in its scope that conclusions must be reached by consensus of opinion of members through the discussion of one topic at the time. A campaign for exchange of ideas should be started among members in order to stimulate interest and there is no good reason why this good work should be confined to local Service only.

The trade papers have been a big help to Service men and would be a splendid way for us to keep in touch with the activities of other associations. The writer or any member of our New York association would be only too glad to invite personal correspondence with any Service men who are interested in the interchange of ideas and I feel that if we would all put our shoulders to the wheel in finding some solution for the betterment of our Service, we can easily gain our point which is to gain the confidence of the public through competency, commercializing Service and showing a fair profit of our department.

Service Station and Repair Shop Appliances

Michigan Reboring and Burnishing Tool

The Michigan Machine Co., Detroit, Mich., manufacturer of "Rollway" pumps, has developed a boring and burnishing tool for reboring and burnishing the cylinders of Fordson tractor engines and Ford Model "T" engines. It is stated that this tool has three features. First, it burnishes the cylinder after boring.



Reboring and Burnishing Tool
This tool is used on cylinders of engines of Ford make

Second, it is supported top and bottom to insure the boring of a true cylinder. Third, the locating of the tool centrally in the cylinder by the use of gage blocks insures greater accuracy.

As a whole the Michigan reborer is light and portable. It requires no extra accessories or expensive machines for use in connection with it.

When the boring has been accomplished the burnishing tool, which is self centering, is applied to the boring tool sleeve by a key which fits the slot in the sleeve. By turning the crank the burnisher is run to the top of cylinder and returned to the bottom again by simply reversing the crank action.

The burnishing tool consists of a series of rollers set between two collars provided with supports to make it strong and durable. The rollers are set at a slight angle which causes them to feed properly through the cylinder bore. The rollers float in the retaining collars which makes the tool self aligning. High-grade hardened and ground tool steel is used in making the rollers.

The boring tool has a single point cutter because this type of cutter is considered easiest to adjust and keep adjusted. The cutter is of high-speed steel and is capable of boring from 20 to 20 cylinders before regrinding is necessary.

The Michigan reboring and burnishing tool can be operated by either hand or power. A crank is furnished for hand operation and universal joint suitable for any drill press for power operation.

In order to permit the rapid return of the cutter to its original position at the top of the cylinder without affecting the newly bored cylinder, provision is made for disengaging the cutter from the work and returning it to the top of cylinder rapidly and in a straight line.

This is accomplished by shifting crank to position No. 2 and reversing the direction of its rotation. The sleeve remains stationary while the screw operates to carry cutter rapidly to top of cylinder.

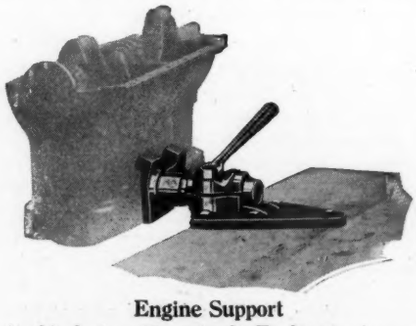
The average time for reboring and burnishing four cylinders by hand is one and one-half hours. For performing the same operation on drill press, one hour.

When the Michigan reborer and burnisher is used you can take the tool to the work wherever it may be and turn out a satisfactorily finished cylinder.

The complete tool is securely packed in a tool chest with hinged lid which may be used to keep the tool in after it is received.

Engine Support

The Ekern bench engine support is a new piece of equipment for the Ford repair shop, and is being manufactured by the H. G. Paro Co., 1410 S. Michigan Ave., Chicago, Ill. It is designed to ably hold the entire Ford power plant assembly in any desired position, while repairs are being made. It is so constructed that it can be bolted to a shop bench.



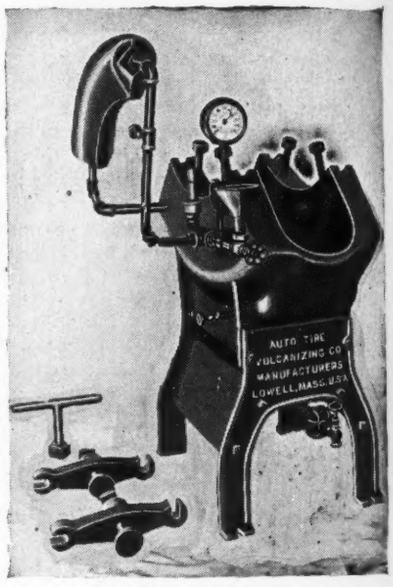
Engine Support
As this device will retain the Ford engine in any desirable position, accessibility to the various parts is afforded

The cylinder block is attached to the support by two cap screws, where the water inlet connection is made. The portion of this device which fastens to the motor block is the same as used on the engine stand, manufactured by this concern, and also on the portable engine work bench. The axle attachment, another product, also fits this device. The construction of it is such that it can be revolved with the engine block in place, the clamp casting retaining it in any desired angle. The weight is 22 lb. and the list price $10.

Auto Tire Vulcanizer

A new vulcanizing outfit has been added to the line of the Auto Tire Vulcanizing Co., 140 Powell St., Lowell, Mass. It is known as the No. 21 Vulcanizer. It includes a steam gage, safety valve, filler valve, overflow valve and No. 4 core attached with yoke and screw.

The vulcanizing cavity is 8 in. wide, diam. of circle 42 in., length ¼ circle. Reducing shells and bead moulds to fit



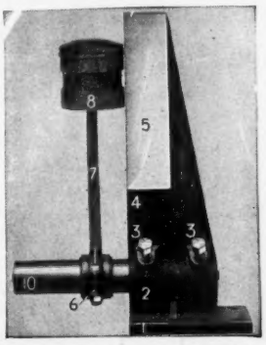
Tire-Vulcanizing Outfit
This single cavity vulcanizer includes a steam gage, safety valve, filler valve, and overflow valve

this vulcanizer can also be obtained. Bead moulds and shells are machine finished and polished so that they will fit accurately tires of their respective sizes. Bead moulds are all made of the same diam. The shipping weight, 800 lb., is approximate. The price is $160.50, complete. With gas burner attached to generate steam, the price is $167.50. Complete with gasoline or kerosene burner attached for steam generation, the price is $172.50.

Piston Aligning and Bearing Fitting Tool

A new tool said to eliminate the inconvenience and awkwardness of crawling and working under the car when adjusting connecting rods, is the product of John Peyer, 301 W. 68th St., New York City. This tool, which is of great value to the service shop and garage repairman, is known as the Superior Piston Aligning and Bearing Fitting Tool. By re-

ferring to the accompanying illustration, a more comprehensive picture of this tool with its various features can be obtained. (1) is the foot or base of the aligning stand, (2) the body containing 1½-in. hole for arbors, (3) are the set screws which hold the arbors, (4) the front surface which is perfectly square with axis of the arbor, (5) the surface used for testing in case the connecting rod is twisted; the connecting rod and bearing and piston are shown by figures, 6, 7 and 8; (10) is one of the arbors which are made standard crankshaft size. The wrist pin can also be set in position for aligning by removing the piston and placing the pin



Superior Piston Aligning Tool
With this tool the piston and rod can be assembled in perfect alignment

against the flat surface by moving the connecting rod slightly to the right.

The arbors and sleeves, made of steel, are hardened and ground. The stand is of good quality cast iron. The Superior Gage is 20 in. high and designed to fit all standard engines. A Superior Gage is also made for Fords or any other car with short connecting rods. The price of the Superior Gage with selected arbor is $24. The Superior Ford Gage with the soft arbor is $12.50.

Tool for Rounding Crankshaft

The Atlas Mfg. Co., North Canal St., Pittsburgh, Pa., has recently announced a new tool, the purpose of which is to make round the bearing surfaces of

Atlas Abrasive Tool
Illustrating the method employed in grinding down the crank pins

crankshafts. It is said to true up flat crank pins at a saving of time. The work can be done right in the crankcase.

The cutters are hardened steel and are used in one direction only. A bronze track bearing is positioned opposite the cutter. There are also adjustable abutment blocks, which slip easily up against the face of the crank pin and hold the cutter and track in proper working place.

The Beardsley Valve Grinder

Speed is the principal feature of the new valve grinder recently announced by the Loomis-Beardsley Co., 1112 Mt. Ver-

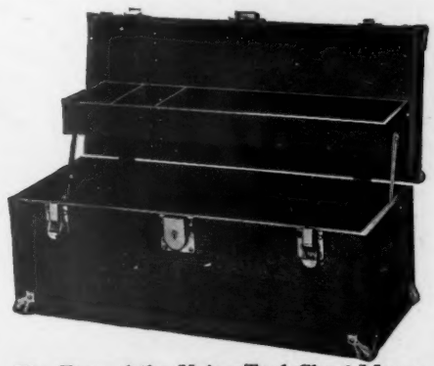
The Beardsley Valve Grinder
The illustration also shows procedure of operation

non Ave., Columbus, O. An additional feature of this valve is the fact that it is light in weight and will accomplish effectively and in a very short time, the work required of it. The price of this tool is $3.50.

Utility Tool Chest

The Union Tool Chest Co., Inc., Rochester, N. Y., has recently brought out a new tool chest designed especially for the convenience of the repairmen, auto mechanics and also for general garage use.

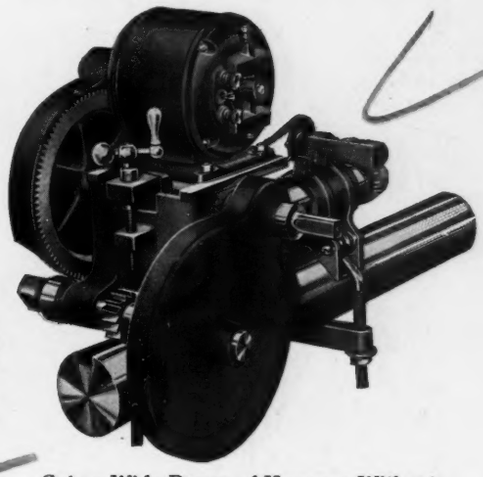
The general construction is similar to the other chests of the Union line. The frame is kiln dried oak, the joints of which are lock-cornered. The top of the cover and bottom are rabbeted in, glued and nailed. To the cover is attached a light but strong tray provided with removable partitions. The feature of this is the fact that when the cover is raised it automatically raises the tray, leaving the contents of both tray and the chest within easy reach. When closed, the tray is flush against the cover, holding contents in place, should the chest be inverted. This new tool chest is made in two sizes in oak and two in leather, a 16-in. and a 19-in. size. The handle is genuine leather, steel-cored and attached with heavy cotters and riveted in. The hardware trimmings are heavy and nickeled and polished. It is also provided with a lock. The leather covered chests are the same as the oak but are made of basswood or oak and are light and strong. The covering is a good grade of imitation leather and is waterproof. The solid oak sizes sell at $7.25 and $7.50 and the leather covered at $8 and $8.40.



The Tray of the Union Tool Chest Moves Up When the Lid is Raised

Electric Keyseating Machine

The Electric Keyseating Machine fitted with a ¼-hp. electric motor has just

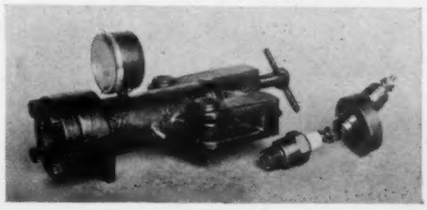


Cuts a Wide Range of Keyways Without Resetting Grinder

been announced by the Bucher-Smith Co., East Liverpool, O. This keyseating machine can cut keyways from 1¼ in. up to 5 in. and ¼ in. to 1¼ in. wide, 12 in. long without resetting. It is strong, durable and compact. The motor can be connected directly by a lamp cord without use of special switches or starting boxes.

Tester for Spark Plugs Under Pressure

It is a known fact that spark plugs sometimes fail to function properly when in the cylinder, even though the mixture is rich and despite the fact that it had sparked when tested in the air. A device



Spark-Plug Tester

that will determine whether a spark is faulty when in the cylinder is being offered to the trade by Weber & Morgan, 1336 Michigan Ave., Chicago, Ill. This new spark plug tester allows the plug to be placed within the chamber, access being obtained by using a removable cap pressed firmly against the cylinder ends with suitable yokes. The terminal of the plug within is connected to an exterior source of high voltage of electrical current through an insulated connector pass-

ing through the cap. A heavy glass lens at the opposite end of the cap permits inspection of the spark under pressure. All joints are air-tight.

New Service Test Bench for Truck Electrical Apparatus

For several years the North East Electric Company has been building an adjustable speed test bench for the use of its service stations in testing electrical equipment. This bench has proved so successful for handling North East Products that it has now been redesigned so as to take care of tests on practically any standard style of Starting, Lighting and Ignition systems in current use.

Test Bench for Testing and Adjusting Electrical Equipment on Any Standard Style Starting, Lighting and Ignition Systems

The adjustable speed feature in the test bench is obtained by a pair of friction disks which can be shifted over the face of the other from center to periphery. With the constant speed shaft driven at about 1800 r.p.m. a perfectly smooth operating range of from 300 to 3000 r.p.m. is afforded on the adjustable speed shaft.

A unique type of coupling is provided for driving the various units tested. This coupling is made in the form of a driving head 3¼ in. diam. perforated with a series of tapped holes arranged spirally from center to edge. Driving studs are furnished with the coupling which can be readily screwed into the holes at the proper radial distance from the center to correspond with the sprocket, gear or coupling on the particular unit under test.

For mounting the various pieces of apparatus—generators, starting motors, ignition units, magnetos—to be tested, the cradle provided is fitted with a pair of V-shaped jaws which can be adjusted so as to raise or lower the unit or shift it laterally with respect to the drive head. To take care of longitudinal adjustments the pad upon which this universal cradle is mounted is provided with an extra set of tapped holes so arranged as to make four locations possible. The cradle itself permits of shifting of the tested unit sufficiently to take care of any required position falling between the four fixed mounting points. A substantial clamp secures the unit firmly in place while under test.

For testing side-base ignition units and separate ignition distributor heads, special fixtures are furnished which can be quickly substituted for the regular cradle whenever needed.

The switchboard which forms part of the equipment is fitted with suitable switches and instruments for making both operating and stationary tests. The instruments are reliable Weston models and are calibrated for the particular range of work that is required of them.

For testing ignition apparatus—distributors, coils, magnetos—a spark gap arrangement is provided which affords a means of investigating the intensity, length and regularity of high tension sparks.

The breakaway torque or maximum pulling effort of starting motors can be measured accurately by means of a spring scale mounted at one foot from the center of the driving coupling so as to register direct in lb. ft. the torque transmitted to it through the torque rod.

With every bench is furnished a book of service information, which contains an explanation of the principles and operation of electrical equipment and also comprehensive instructions for assembling and testing. This bench lists for $400.00.

The Ibsco Combination Battery Steamer and Still

The Combination Battery Steamer and Still manufactured by the Illinois Battery Steamer Co., Peoria, Ill., combines two devices into one, necessitating but one flame.

The boiler is of 14 gage spun aluminum and has no seams. The water level may be ascertained from a water gage attached to the boiler. Six brass steam cocks having special nipples are utilized for steaming the batteries. To the nipples are attached the steam hoses which form air-tight joints without the use of clamps. The still is bolted directly to the boiler dome. The copper tubing from the boiler dome passes through the air space in the center of the dome. This tube conveys the steam to the top of the still, then down in the cooling water and off into the distilled water container. The water supply is controlled by two valves. One regulates water to the boiler and the other the cooling water in the still. This still has a capacity of one gal. per hour at a cost of one cent per gal. The acid or acid fumes that generally exist in a battery repair shop, will not rust or corrode this steamer as it is constructed entirely of aluminum and brass. This outfit, complete with necessary valves, steaming hose, etc., lists at $45.

Pennsylvania Section of the Society of Automotive Engineers will be addressed by A. K. Brumbaug at its December meeting.

The Illinois Battery Steamer Company. Combines Two Devices Into One, the Battery Steamer and the Still.

What Needs to be Done to the Truck to Have It Match the Pneumatic Tire Equipment

(*Continued from page 98*)

how much the factor of safety can be changed due to this time element. Any suggestions along this line will be appreciated. We have, however, as Mr. Scott will tell you, taken a two ton chassis and put in 5 ton engines and made the trucks haul 3½ tons of freight very successfully, and from numerous other trials like this, conclude that if a factor of safety of five is safe with solid tire equipment, then six can be allowed for pneumatic equipment.

This refers mainly to unsprung parts. In regard to sprung parts, it is rather problematical to even estimate the allowable stresses. It appears that the factor of safety can be shaded but not so much as in the case of unsprung parts. For instance, with pneumatics, the frame is not jarred to pieces in the same manner as with solids, the rivets stay tight, etc. Fig. 11 shows how the engine is cushioned by the pneumatic tire.

In order that you may know further how to estimate or determine stresses due to the introduction of pneumatic tires we have made the following trials to show the characteristics of the pneumatic tires as compared to the usually corresponding solid tires. These tests indicate the amount of circumferential deflection under certain tractive effort and the sidewise deflection due to a force pulling sidewise on the wheel.

Emergency Equipment—Spare Tires

One of each size tire on the truck should be carried if the truck goes as much as 25 miles away from its base.

The method of carrying these tires is quite a problem. However, I believe it is worth while to make "real" arrangements to handle this spare equipment by design of the body or chassis. Probably the best way would be to place a compartment directly back of the driver's seat so that the tire can be removed and replaced without disturbing the pay load. The next best place is under the chassis frame at the rear and at the side opposite the muffler.

Tire Pumps

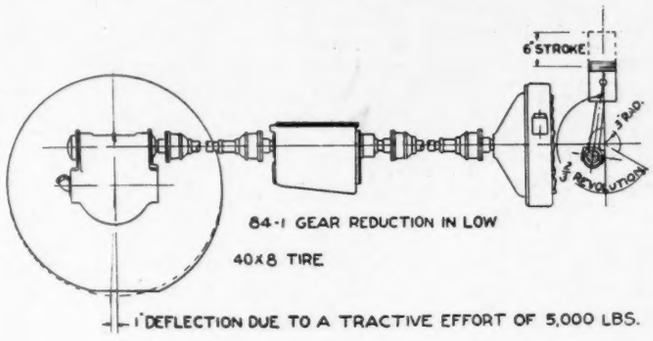
A power-driven tire pump is indispensable when pneumatic tires are used for the main reason that the truck cannot be removed any distance on a deflated tire without causing serious damage. This pump should be designed and arranged to drive from the transmission. At least, this is preferable for the reason that a pump, mounted on the engine, adds to the congestion under the hood, and the small shaft available, already carrying the water pump and magneto is not strong enough for an air pump. It can best be air-cooled due to its intermittent service, and difficulty of embodying any efficient water cooling arrangement without much expense. Also, its lubrication should be well worked out with a view of avoiding any oil discharge which would injure the tire inner tube. The speed at which the pump is to operate should not exceed one-half engine speed and in any case not over 600 r.p.m.

The pump should operate to permit complete inflation of a ten inch tire in approximately 10 minutes. This figure is being reached by the most efficient pumps now on the market.

Note that a 44 x 10 tire holds 5700 cu. in. of air. The area of the orifice through which the air must pass in a standard tire valve is .00307 sq. in. Hence, if a pressure of 200 lb. upon this orifice is assumed, the very minimum time of inflation of a 44 x 10 tire would be about six minutes.

It is debatable whether a two-stage pump is advisable in this service. Certainly present design would not indicate this to be true, as there are single stage pumps quite as efficient as any two-stage, for this relatively small volume.

CUSHIONING EFFECT UPON ENGINE DUE TO CIRCUMFERENTIAL DEFLECTION OF TIRES IN STARTING A PNEUMATIC TRUCK.



$$\frac{\text{CIRCUM. DEFL. OF TIRE}}{\text{CIRCUM. OF TIRE}} \times \text{TOTAL GEAR REDUCTION} \times \text{CIRCUM. OF CRANK PIN CIRCLE} = \text{TRAVEL OF CRANK PIN}$$

$$\frac{1}{40 \times 3.1416} \times 84 \times (6 \times 3.1416) = 12.61$$

$$\frac{\text{TRAVEL OF CRANK PIN}}{\text{CIRCUM. OF CRANK PIN CIRCLE}} = \text{FRACTION OF REVOLUTION OF ENGINE DUE TO TIRE CIRCUM. DEFLECTION}$$

$$\frac{12.84}{18.85} = .66 \text{ OR APPROX. } \tfrac{2}{3} \text{ OF ONE REVOLUTION OF ENGINE}$$

Fig. 11

As an aid to increased efficiency, it is suggested that the air intake on the pumps be piped to a clean point on the truck, under the seat perhaps, thus insuring against dirt being sucked into working parts. At least six feet of copper tubing should be placed between pump and hose to avoid burning off of latter. The advisability of placing a small receiving chamber in the line has been suggested, that would equalize the air pressure and assist in reducing the excessive temperature of air delivered.

Driver's Comfort

Pneumatic tires add considerable to the comfort of driving a motor truck. If the truck is to operate on long distances, additional attention should be given to the comfort of the driver, such as an enclosed cab, easy and comfortable steering gear, and heat for winter time.

Cost

This item is one that strikes home to all of us.

After giving this matter of cost some considerable study, I believe that it is possible to build a five ton motor truck chassis equipped with pneumatic tires for only $200 to $300 more than a corresponding solid tired truck, and that the net weight reduction may be easily 1000 lb. without resorting to aluminum where it is not yet considered commercially practical.

It may be of interest to you to know that we have under construction at the present time two five ton motor trucks which embody the program that I have recited here so far as it applies to that capacity of truck. These trucks will have the following specifications and will possibly be ready for display at the Chicago meeting:

Engine—5 x 6, 4 cylinder.

Transmission—Unit power plant and auxiliary, 14 to 1 low gear reduction.

Rear Axle—Goodyear tandem rear. Made up of two worm drive axles of 1½ ton solid tire rating in the one case and two internal gear axles of same rating in the other. Rear axle gear reduction 5.8 to 1.

Front Axle—3½ ton solid tire rating.

Frame 3 x 7 x ¼ in. pressed steel.

Tires 40 x 8 all around (6).

Wheel Truck

On account of the large size and weight of the 48 x 12 tire, we were brought to consider the application of four smaller tires to the rear of the truck instead of two of the excessively large ones. Our first attempt at an arrangement for applying four small tires to the rear without using dual tires (which latter is considered out of the question) is shown in Fig. 12 and consisted of a more or less standard rear axle with a walking beam adapted to each end and the wheels mounted upon trunnions from this walking beam, the springs being mounted upon the axle and attached to the frame on the inside. Chain drive was made use of in this case, which by the way is about the only feasible drive with this arrangement. This construction ran successfully for about 10,000 miles before

serious failure occurred. We were however inconvenienced with the chains jumping off and were not able to get a brake mechanism that would work. The main point against this design was its enormous weight; however, it served to show us that satisfactory tire mileage could be secured from such an arrangement and that there was a good possibility of adapting four small tires to the rear.

In order to further develop this point, we built up the tandem axle construction, as shown in Fig. 13 and Fig. 14. This construction appears to have good possibilities and has at present operated some 2300 miles, 1000 to 1200 miles of which has been entirely rough and uneven country road, so rough in fact that that it was difficult to keep the front springs tight. The principle of construction can be easily seen by referring to the cut.

Following is listed some advantages of the "six-wheel" truck over the regular type of same capacity, on 48 x 12 pneumatics, and on regular equipment of solids:

Price comparisons are on the basis of manufacturer's price:

Compared with pnuematic tired four-wheel truck:

Tire Cost of Rear of Truck

2 48 x 12 tires complete at $511 each	$1022.00
4 40 x 8 tires complete at $113.63 each	454.52
Saving	$567.48

Saving by use of four smaller tires is sufficient to purchase five complete spares.

Ease of Handling

Each 40 x 8 tire weighs only 127 lb., whereas each 48 x 12 tire weighs 385 lb.

Carrying a spare tire in each case, the total weight reduction in tires alone amounts to 520 lb. in favor of the 8-in. tires.

Then again the 8-in. spare can be used as a front wheel spare also; which still further reduces the tire investment.

Reduction in Axle Cost

The use of two rear axles in tandem results in the following advantages: Small axles normally are in large production with consequent lower cost, whereas large sizes are made only in small quantities with extremely high costs.

The actual saving amounts to about $120 per truck.

Weight Saving

While four 8-in. wheels with brake drums, etc., weigh 77 lb. more than the same equipment for a 12-in. tire,

A 5-ton axle weighs	1660 lb. less drums
and two 1½-ton axles weigh	1200 lb. less drums
This makes axle saving of	460 lb.
Add saving weight of tires	520 lb.
Totals	980 lb.
Less excess weight on wheels and brake drums	77 lb.
Saving in weight over 12-in. tire	903 lb.
There is a further saving in weight of springs, radius rods, etc., of	300 lb.
Net saving in weight	1203 lb.

Traction Qualities

The area of contact of four 8-in. pneumatic tires upon the road is about 27 per cent. greater than two 12-in. pneumatics.

This additional surface, keeping tires from sinking in soft places, gives better traction under condition when most needed, and in ordinary service the additional area gives a better chance to take hold.

As compared to solid tires in winter service, off of paved roads, etc., the four pneumatic tires have all of the advantage.

Economical Factor

The four-wheel combination has about the same advantageous effects over single axle construction that the pneumatic would have over solid tires.

With the four-wheel combination when passing over an obstruction in the road, the chassis is raised only one-half the distance it would be raised in the regular type of construction. This reduces the acceleration of bodies upon chassis to one-fourth that on ordinary construction.

Thus by reducing shocks and vibration, the number and cost of repairs, due to crystallization, fatigue of metal, etc., is reduced by a large percentage.

Riding Qualities

The above construction makes for such exceptional riding qualities, that a glass, filled within an inch of the top with water, attached to the rear of the six-wheel truck, lost none of the water even when operated over a decidedly rough and rocky road. .

Effect Upon Roads

The most destructive factors of the operation of vehicles upon pavements is the wheel load and the wheel thrust.

This tandem rear drive arrangement cuts in two the heavy wheel loads and the thrust as well, thereby making it possible to design pavements suitable for 3½-ton trucks, and carry five and seven ton loads upon them with no increase in destruction.

Compared With Solid Tired Trucks

Two 48 x 12 solid tires and wheels	1262 lb.
Four 40 x 8 pneumatic tires and wheels	1208 lb.
and without spare, saving in tire and wheel weight over solid tire equipment	54 lb.
Add saving weight of axle	460 lb.
Add saving weight of springs, etc.	300 lb.
Total saving over solid tires	814 lb.

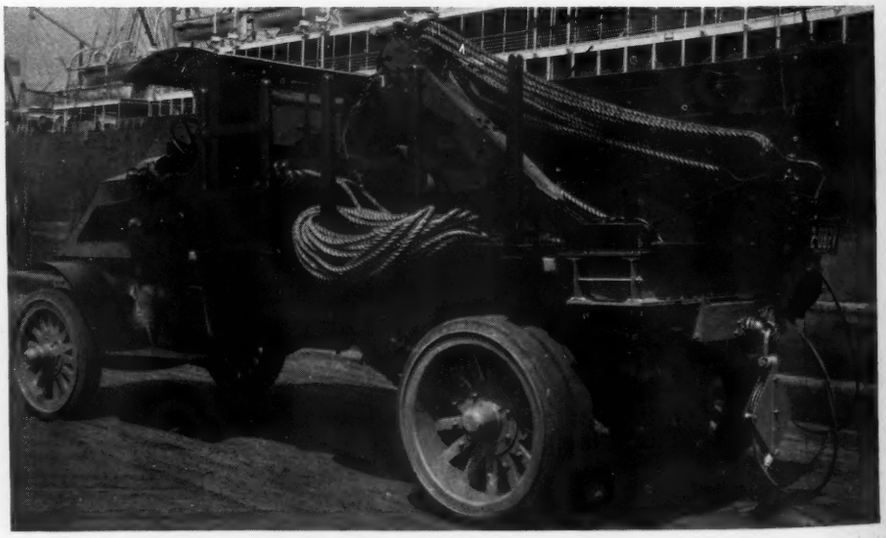
Larger Brakes

The twin axle combination has a decided advantage over both regular pneumatic tires and solid tired types in that four brakes of 21 in. diam. are used in place of two brakes of 21 in. diam.

Greater Operating Radius

Pneumatic tires permit of an increase of average speed just double that of solid tires, and the combination of four small tires will permit of increased minimum speeds on bad roads, rough streets, etc.

In view of the fact that the trucks we are building are for the purpose of demonstration and test, we are very desirous that you gentlemen suggest to us what you would consider a test that would prove out the points that are yet open



A Mack Seven and a Half Ton Service Wrecker

This truck is equipped with a Meade-Morrison horizontal drum winch and collapsible derrick. The derrick is removable, and the truck body may be used to haul merchandise if necessary. In use, the derrick extends back over the rear of the truck. It is capable of lifting the heaviest truck bodily from the ground, and can tow disabled trucks on either front or rear wheels by raising the other end clear of the ground. Under the rear of the body platform, are two I-beams to support the weight of the derrick. Between the I-beams are two heavy 8 inch by 10 inch wood blocks, which, when the derrick is in use, rest on the ground and thus relieve the springs.

Service Managers Discuss Factory Problems

Discussions Centered on Passenger Car Service. Permanent Organization Formed as Division of N. A. C. C.

CONSIDERED from an academical viewpoint, the Service Managers' Convention, held in Detroit, November 10-12, proved to be a highly successful affair, especially to those men who have but recently assumed the duties of Service Managers. It was evident from the numerous commonplace questions asked during the sessions that a great many of the men who are handling the factory service departments are still very much at sea in realizing what kind of a problem they are up against. Some know it—but factory policies would not let them admit it.

Nevertheless the various papers read and the discussions that followed gave the newcomers a good many valuable thoughts to carry home with them. Even though the service problem still remains unsolved the interchange of ideas and the get-to-gether spirit shown by these men cannot help but produce beneficial results. The meeting was strictly a gathering of factory service men, no dealers' representatives being invited. It was also unfortunate that so few exclusively truck factory service men were present.

However, this can be readily understood when it is considered that the convention was called by the National Automobile Chamber of Commerce and that incidentally a large percentage of the existing truck builders are not members of this body.

In consideration of these facts it was not surprising that the service problems were discussed mostly from the factory angle. It was also noticeable from the proceedings of the meeting that nearly every Factory Service Department is subordinate to the Sales Department—or, as in one or two instances, to the Engineering Department with the result that an organization of factory service managers at best can only offer suggestions. It is usually the factory sales department that determines what the service department shall do.

Over one hundred and fifty factory service men attended the two days sessions. The third day was given over to inspection trips through some of Detroit's representative automobile factories.

The meeting was opened by Roy D. Chapin, president of the Hudson Motor Car Company. Mr. Chapin welcomed the members and related in a humorous manner some of the troubles which he as "repair manager" of the Olds Motor Works had encountered back in 1901. The Service Department was an unknown quantity in those days. He brought home the fact that within the next two years, when the selling of cars will be more of a man's job than it is now, the Service Manager's job will become more important than ever before, as sales of new machines will depend largely upon service and reputation. Mr. Chapin contends that sales do not depend upon advertising alone, but that selling becomes a real business when production is at its maximum.

Discuss New "Square Deal Policy"

E. T. Herbig, sales manager of the Service Motor Truck Company, and chairman of the Standard Repair Parts and Service Policies Committee of the N. A. C. C., again presented the recommendations of his committee on the revision of Service and Repair Shop Policies. A great deal of discussion ensued after the reading of this report and while many favored the adoption of the "square deal policy," as outlined by Mr. Herbig, the opposition to the new policy seemed to be in the majority. In order to bring the arguments to a conclusion it was decided to have the report printed and submit it to the members for a mail vote. The statement was also made that a separate policy would be advisable on truck service as against passenger car service. Several men agreed that the present warranty—although not strictly lived up to by most of the factories—afforded legal protection and which would be the only logical reason for retaining it. Others contended that the present warranty could not be dropped until owners are properly educated as to the amount of service they can expect. Incidentally the over zealous salesman came in for his share of condemnation. A suggestion was made that probably an educational campaign on the part of sales departments would help eradicate this condition. This is where the Service Department passed the buck.

E. A. Haskins, service manager of the Federal Motor Truck Co., read a paper on "Maintenance Relations Between Accessory, Parts and Assembly Manufacturers and the Vehicle Manufacturer, the Distributor, Dealer and Owner." This was one of the few papers that gave any consideration to service from the truck angle. Extracts from this paper are printed elsewhere in this issue. One of the strong points in this paper was the assertion that the owner should not be held up on parts, and that although the sale of parts to owners direct by the parts maker should be discouraged, such a transaction should not be prohibited, for the reason that the placing of the owner's vehicle into commission is of vastly greater importance than where the parts came from. The parts makers came in for discussion after this paper was read. It was brought out that a great many owners preferred to deal direct with the parts maker instead of the dealer. The statement was made that in some instances the parts maker referred this business back to the vehicle builder and in a great many cases he did not. To settle the discussion, it was voted to send copies of the papers covering this subject to the parts makers.

The January issue will contain a detailed review of the New York Truck Show

The next paper, that of service manager L. C. Voyles, of Nordyke & Marmon, brought out the fact that the factory must give more protection to the dealer and that the dealers' salesroom and service station must be so well equipped and stocked with parts that the owner will not have any excuse for going elsewhere for his work. Quite naturally, during the discussion a few raps were taken at the independent repair shops. The opinion prevailed that the direct factory representative was usually better equipped to give service on certain makes of cars than the independent repair shop. Nevertheless it was agreed that the independent repair shop is necessary in isolated territories, but that it should be responsible to the dealer.

The afternoon session of the first day's program included the reading of three papers. Mr. Lester, of the Packard Motor Car Company, handled the subject "The Organization and Functions of a Factory Service Department for Maximum Service Efficiency." R. C. Reichel (Chalmers) spoke on the "Functions of Direct Factory Service Representatives in the Field." "The Improvement of Vehicle Design and Quality Through Service Records" was presented by Walter M. Ladd, of the Pierce-Arrow Company.

Rognon Takes Up Dealers' Problems

Practically the only paper that paid particular attention to the dealers' problems was that of Ralph C. Rognon, president of The Automotive Service Association, of New York. In his paper "What the Dealers Require from the Factory Service Department" he brought out the fact strongly that the service station is the bumper between the factory and the owner. He advocated the centralized service station with its corps of skilled mechanics as a means of overcoming some of the present service problems. A paper on this subject is presented elsewhere in this issue.

H. W. Drew, of the Packard Motor Car Company, illustrated by charts the method used by his company to regulate the distribution of parts.

W. M. Warner, of the Cadillac Company, dealt with the subject of "Pirate Parts," while J. B. Bray, of the Grant

Company, spoke on "The Extent to Which Free Service to the Customer Constitutes Good Business." O. T. Hillshafer, of the Chandler factory, discussed "The Most Efficient System of Estimating Charges to Customers for Repairs."

The next paper and the last one scheduled on the official program was that by A. B. Cumner, service manager of the Autocar Factory. Mr. Cumner emphasized the importance of starting an educational campaign for the purpose of showing the owner that he has certain obligations to meet and duties to perform in connection with the service he expects from the dealer. He stated that the manufacturer of the vehicle should see to it that the user does his part insofar as the maintenance of the vehicle is concerned.

There's a Big Difference Between Service and "Free Service"

By THEODORE D. PRATT*

ONE of the words, if not the word, most found in the mouth of motor truck salesmen is "Service," and if one asks them to define it, one gets about as many answers as there were salesmen questioned.

Well, WHAT is Service?

"Service" as applied to motor trucks ought to be easily defined. It means, if it means anything, keeping the wheels turning. Like many things however, easy to define, it generally is hard to practice. The "Service" of a dealer in motor trucks should be an asset to him and a business getter, but is it—frequently it is not. And why not? In many instances the seller of the truck has not been long enough in the business to know what his customers need. In other cases he changes the make of truck which he handles so often that he is unable to accumulate a sufficient supply of parts for the truck he is handling at a given time—and this condition by no means is always the fault of the agent.

If the various manufacturers of, and dealers in, motor trucks were to analyze what is spent for "free" service (one of the evils of the truck business) and the results accomplished thereby, many a headache would result—and they should be analyzed, for the results will mostly be found on the negative side. That is to say, no permanent good is accomplished; for instance, if one driver constantly brings his truck to the service station for examination and adjustment, yet fails to take enough interest in what is done to learn the causes which underlie the need for adjustment and thereby prevent their recurrence. Most of the money that is spent in "free" service is spent repairing a fault either of the truck seller or the buyer, and when scrutinized it will be found that a large part of this work never comes to the attention of a responsible party on either side, so no steps are taken to permanently reduce or perhaps eliminate it.

There are only two kinds of service which are of lasting value to both seller and buyer, and in both cases the buyer pays for it whether he realizes it or not. In one case he pays for it either by added overhead to the dealer's business, of which he at one time or another pays his share, or the "free" service eventually causes the dealer to retire from business and the customer then pays for it in lost time waiting to obtain a spare part from the factory.

"Something for nothing" dazzles, but in the words of the small boy "it ain't." There is no such thing. It is almost a truism that the more a man pays for a thing the more he values it. If the selling companies would take the money represented by "free service" and employ representatives or teachers, to call on all users of trucks regularly and educate them in proper and economical operation of trucks, both parties would make money and friends. This is one kind of service which does not appear on the horizon yet. It has, however, an alternative. Make the customer pay for what is now "free" service. Make it cost him so much that, whether fleet owner or single operator he will study his trucks and learn how to keep the wheels turning and earning. It is not meant by this that the truck dealer is to overcharge, but he should charge those who improperly make continuous demands on him for things which they should do for themselves.

Is Up to Owner

Barring accidents, no truck should lay up over 10 days in a year unless for lack of business, if given inspection and care by the owner, NOT by the dealer. In nearly all cases where the burden of keeping the truck in working shape depends on the service department of a dealer, the owner learns but slowly how to care for his own property and in addition blames the dealer for selling him a truck which is no good.

If the owner had to pay every time the dealer or his employees looked at the trucks, certainly at least for every time they touch it, except in cases where the dealer is plainly at fault, he would soon learn to do his own looking and touching in a less expensive manner, and at less expensive moments.

While it is a custom of many dealers to give a regular inspection service to their customers, by having the trucks brought to the dealer's service station and there carefully inspected and minor adjustments made, this service, when free, is open to much abuse, for many users come to rely on the dealer to keep their trucks in good condition for them, and so shift the burden of responsibility. The dealer has to carry a crew for this purpose, if his business is at all large, and he really is carrying it for the purpose of correcting the owner's faults.

This kind of service costs the dealer the wages of one or more mechanics, shop rent, oil, soap, grease, waste, etc., and the owner the value of the service of his truck while it is idle. The intention is good but I fail to see anything "free" about such service. To me it appears expensive to both parties.

The Parts Service

The other kind of service is a prompt and complete supply of parts, reasonably priced. I question whether a dealer who sells a bolt and nut for fifty cents when it can be purchased in a hardware store or a mill supply house for five cents is rendering any service at all to this customer. To my mind this question of a prompt and complete supply of parts is the most necessary and important function of service department of a dealer.

Many users have fleets too small to justify their own repair shops, and must therefore rely on the dealer for their repair work. There is a large field for this class of work which should not be confused with the "free" service department. The repair shop should be operated to show a profit, and unless it does the dealer is simply storing up trouble for his customers at some future time.

There is of course, emergency service. This service is what its name implies and a comprehensive emergency service can only be looked for from fairly large establishments.

Need of Education

If a truck dealer would render his customers a real service he should educate them in proper maintenance methods as rapidly as possible, to inspect and maintain by adjustments and minor repairs their own trucks and to stay out of the service station.

He should show them that the so-called "free" service, when extended over any length of time, is a snare and a delusion, which eventually means more expense and less satisfaction with the truck, to the owner. He will then have shown the customer that the more he knows about his truck the less it will cost him to operate it, and greater efficiency will result.

By doing this the dealer will find that his repair shop will have time for legitimate repairs and replacement jobs at a profit, and that their customers' trucks will run so cheaply, smoothly and satisfactorily that each customer will become a volunteer salesman. **Think It Over.**

*Mr. Pratt is executive secretary of the Motor Truck Association of America, Inc., New York City, an organization composed of truck users and having a dealer division. Previous to becoming identified with the association he had charge of a large fleet of motor trucks and is entirely familiar with the owners' problems.

Replacement Table. Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter will be found either the size of the main air intake or the gasoline fuel line

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Diameter	Outer Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Acason R.	3	1/4	1	.....	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason RB.	3	1/4	1	.....	11 1/2	3 1/2	1/4	2	11 1/2	3 1/2	1/4	2	112	34
Acason H.	3	1/4	1 1/4	.....	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	130	35
Acason L.	3	1/4	1 1/4	.....	16	3 3/4	1/4	2	16	3 3/4	1/4	2	137	35
Acason M.	3	1/4	1 1/4	.....	18	4 1/2	1/4	2	18	4 1/2	1/4	2	167 1/2	35
Ace, Series A1 1/2	3	....	1 1/16	1 3/4	12	3 1/4	1/4	4	12	3 1/4	1/4	4	122 1/2	32
Ace, Series A2 1/2	3	1/4	1 1/16	1 3/4	13 1/2	3 1/4	1/4	4	13 1/2	3 1/4	1/4	4	144 1/2	32
Acme B.	3	1/4	1 1/4	.....	12	3 1/4	1/4	4	12	3 1/4	1/4	4	116 3/8	34
Acme F.	3	1/4	1 1/4	.....	12	3 1/4	1/4	4	12	3 1/4	1/4	4	124 3/8	34
Acme A.	3	1/4	1 1/2	.....	14	3 1/2	1/4	4	14	3 1/2	1/4	4	135 1/2	34
Acme C.	3	1/4	1 1/2	.....	16	3 3/4	1/4	4	16	3 3/4	1/4	4	150 1/2	36
Acme E.	3	1/4	1 1/2	.....	18	4	1/4	4	18	4	1/4	4	160	37
All-American A.	3	1/4	1 1/4	1 11/16	42 1/2	2	1/2	1	39 11/16	2	1/2	1	104	31
All-American B.	.....	.....	1 1/4	1 11/16	.....	2	1/2	1	.....	2	1/2	1	121 1/2	34
Apex C.	3	1/4	1	1 1/4	42	2	.....	1	41 1/2	2	.....	1	102	35
Apex D.	3	1/4	1	1 1/4	42	2	.....	1	41 1/2	2	.....	1	102	35
Apex E.	3	1/4	1	1 1/4	54	2 1/4	.....	1	53 1/4	2	.....	1	128	31 1/2
Armleder KW.	3	1/4	1 1/4	1/4	42	3	1/4	1	16	3 3/4	1/4	8	150	39
Armleder HW.	3	1/4	1	1/4	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	140	30
Atterbury 7R.	3	1/4	1 1/4	5/8	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	115 3/8	34
Atterbury 7CX.	3	1/4	1 1/4	5/8	13 1/4	3 1/2	1/4	4	13 1/4	3 1/2	1/4	4	133 3/8	34
Atterbury 7D.	3	1/4	1 1/4	5/8	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	145 3/8	37 1/2
Atterbury 8E.	3	1/4	1 1/2	5/8	17 11/16	4	1/4	4	17 11/16	4	1/4	4	157 7/8	37 1/2
Autocar XXI-F.	4	1/4	1 1/4	.....	16 1/4	2 1/2	1/2	4	13	2 1/2	1/2	4	91	34
Available H2.	3	1/4	1 1/4	1 1/8	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	Opt	32
Available H2 1/2	3	1/4	1 1/4	1 1/8	.....	.....	.....	.....	.....	.....	.....	.....	Opt	32
Available H3.	3	1/4	1 1/4	1 11/16	16	3 3/4	1/4	4	16	3 3/4	1/4	4	Opt	36
Available H5.	3	1/4	1 1/4	1 11/16	16	4	1/4	4	16	4	1/4	4	Opt	38
Beck-Hawkeye A.	.....	.....	1 1/2	1 1/4	24	2	1/2	1	24	2	1/2	1	114	54
Beck-Hawkeye B.	.....	.....	1 1/2	1 1/4	24	2	1/2	1	24	2	1/2	1	114	66
Beck-Hawkeye C.	.....	.....	1 3/4	1 1/2	25	2 1/4	1/2	1	25	2 1/4	1/2	1	108	66
Beck-Hawkeye D.	3	1/4	1 3/4	1 1/2	25	2 1/4	1/2	1	25	2 1/4	1/2	1	108	72
Belmont A.	.....	.....	1	1 1/2	32	2	1/4	2	31	1 1/2	1/4	2	78	34
Belmont B.	.....	.....	1	1 1/2	41	2	1/4	2	40	1 1/2	1/4	2	120	36
Belmont C.	.....	.....	1	1 3/4	41	2 1/2	1/4	2	40	2	1/4	2	124	36
Bethlehem D.	3	1/4	1	1/4	43	2 1/2	1/4	2	40 1/8	1 3/4	1/4	2	120	34
Bethlehem E.	3	1/4	1	1/4	51	3	1/4	2	49	2	1/4	2	138	34
Bethlehem F.	4	1/4	1	1/4	55	3	1/4	2	50	2	1/4	2	156	34
Brinton F.	3	1/4	1 7/16	3/4	13	3 1/2	1/4	8	13	3 1/2	1/4	8	135 1/2	33
Brockway S.	3	1/4	1	.....	20	2	1/4	4	20	2	1/4	4	118	32
Brockway K.	3	1/4	1 1/4	.....	12	3 3/8	1/4	4	12	3 3/8	1/4	4	136 1/2	34
Brockway R.	3	1/4	1 1/4	.....	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	154 1/2	36
Brockway T.	3	1/4	1 1/4	.....	18	4	1/4	4	18	4	1/4	4	153	36
Chicago C1.	.....	.....	1	.....	13	3 1/4	1/4	4	13	3 1/4	1/4	4	111	36
Chicago C1 1/2.	.....	.....	1	.....	13	3 1/4	1/4	4	13	3 1/4	1/4	4	125	36
Chicago C2 1/2.	.....	.....	1 1/4	.....	13	3 1/2	1/4	4	13	3 1/2	1/4	4	135	36

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Chicago C3 1/2.	.....	.....	1 1/4	.....	15 1/2	3 3/4	1/4	4	15 1/2	3 3/4	1/4	4	180	36
Clydesdale 120B.	3	1/4	1 11/16	1/8	18	4	1/4	4	18	4	1/4	4	207	38
Clydesdale 90.	3	1/4	1 5/8	1/8	16	3 3/4	1/4	4	16	3 3/4	1/4	4	166 1/2	38
Clydesdale 65X.	3	1/4	1 7/16	1/8	13 1/4	3 1/2	1/4	4	13 3/4	3 1/2	1/4	4	137	33 1/4
Clydesdale 42.	3	1/4	1 1/4	1/8	12	3 1/4	1/4	4	12	3 1/4	1/4	4	117 1/2	34
Clydesdale 32X.	3	1/4	1 1/4	1/8	20	1 3/4	1/4	4	20	1 3/4	1/4	4	117 1/2	34
Columbia G.	.....	.....	1 1/4	.....	55	3	1/2	2	50	2	1/2	2	132	32 1/2
Columbia F.	3	1/4	1	.....	39 1/4	2 1/2	1/2	2	40 1/2	1 3/4	1/2	2	108	32 1/2
Columbia E.	3	1/4	1 1/4	.....	55	3	1/2	2	50	2	1/2	2	132	32 1/2
Comet.	4	1/4	1	1	17 1/4	2 1/4	1/2	2	17 1/4	1 1/2	1/2	2	100	36
Commerce E.	3	1/4	1	1/8	45	2 1/2	1/2	2	43	2 1/4	1/2	2	92	34
Commerce EP.	3	1/4	1	1/2	45	2 1/2	1/2	2	43	2 1/4	1/2	2	100	34
Conestoga 12.	.....	.....	1	1/8	39	2	1/2	1	39	2	1/2	1	86	34
Conestoga 20.	3	1/4	1	1/8	22	2 1/2	1/2	2	14	2 1/2	1/2	2	96	32
Conestoga 30.	3	1/4	1	1/8	22	2 1/2	1/2	2	14	2 1/2	1/2	2	120	32
Corbitt E.	3	1/4	1	1/8	19	2	1/2	2	19	2	1/2	2	105	34
Corbitt D.	3	1/4	1 1/4	1/8	45 1/4	2	1/4	1	35 1/4	2	1/4	1	120	34
Corbitt C.	3	1/4	1 1/4	1/8	51 1/2	2 1/4	1/4	1	51 1/2	2 1/4	1/4	1	138	35
Corbitt B.	3	1/4	1 1/4	1/8	51 1/2	2 1/4	1/4	1	51 1/2	2 1/4	1/4	1	138	35
Corbitt AA.	3	1/4	1 1/2	1/8	69 1/4	3	1/4	1	69 1/4	3	1/4	1	160	38
Corbitt A.	3	1/4	1 1/4	1/8	64	2 1/2	1/4	1	64	2 1/2	1/4	1	160	35
Couple Gear HC.	.....	.....	2	1 3/4	48	3	1/4	2	.....	.....	.....	.....	168	42
Couple Gear AC.	.....	.....	2	1 3/4	48	3	1/4	2	.....	.....	.....	.....	168	42
Couple Gear LO.	.....	.....	2	1 3/4	48	3	1/4	2	.....	.....	.....	.....	168	42
Dart E.	3	1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	102	34
Dart CC.	3	1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	112	34
Dart L.	3	1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	124	34
Dart.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	144	38
Day-Elder A.	3	1/4	1 11/16	1 1/8	47	2 1/2	1/2	1	33 1/2	2 1/2	1/2	1	103	35
Day-Elder B.	3	1/4	1 11/16	1 1/8	47	2 1/2	1/2	1	33 1/2	2 1/2	1/2	1	120	35
Day-Elder D.	3	1/4	1 11/16	1 1/8	48	2 1/2	1/2	1	33	2 1/2	1/2	1	151 3/4	35
Day-Elder C.	3	1/4	1 11/16	1 1/8	57	2 1/2	1/2	1	43	2 1/2	1/2	1	151 3/4	35
Day-Elder F.	3	1/4	1 11/16	2	57	2 1/2	1/2	1	43	2 1/2	1/2	1	145	35
Day-Elder E.	3	1/4	1 11/16	2	68	3	1/4	4	68	3	1/4	4	155	37
Dearborn BW.	3	....	1	.....	16 1/2	2 1/2	1/2	2	16 1/2	1 1/2	1/2	2	112	32
Dearborn F.	3	1/4	1	.....	16 1/2	2 1/2	1/2	2	16 1/2	1 1/2	1/2	2	93	36
Dearborn C.	.....	.....	.....	3/4	38	2	1/2	1	38	2	1/2	1	107	32
Defiance B.	3	1/4	1	.....	45	2 1/2	1/2	1	43 1/16	2 1/4	1/2	1	116	34
Defiance C.	3	1/4	1	.....	54 7/16	2 1/2	1/2	1	52 1/2	2 1/4	1/2	1	116	34
De Kalb E2.	3	1/4	1 1/4	1 1/4	28	3 1/2	1/2	1	28	3 1/2	1/2	1	120	30
De Kalb E2 1/2.	3	1/4	1 1/4	1 1/4	28	3 1/2	1/2	1	28	3 1/2	1/2	1	132	32
Denby 12.	3	1/4	1	.....	43 1/2	2 1/2	1/2	1	39 1/2	1 3/4	1/2	1	95	34
Denby 134.	3	1/4	1	.....	51 1/4	2 1/2	1/2	1	47	2	1/2	1	129	34
Denby 25.	3	1/4	1 1/4	.....	55 3/4	3	1/2	1	51	2	1/2	1	142	34
Denby 27.	3	1/4	1 1/4	.....	61 1/2	3	1/2	1	58	2 1/2	1/2	1	186	34
Denby 210.	3	1/4	1 1/4	.....	89	2 1/4	1/2	1	89	2 1/4	1/2	1	186	34

Replacement Table—Continued

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Diamond T-J5	3	3/16	1	1 1/4	12 1/2	3 1/4	1/4	8	12 1/2	3 1/4	1/4	8	97 1/4	34
Diamond T-J4	3	3/16	1	1 1/4	13 1/4	3 1/2	1/4	8	13 1/4	3 1/2	1/4	8	128 1/4	34
Diamond T-J3	3	3/16	1 1/4	1 1/2	13 1/4	3 1/2	1/4	8	13 1/4	3 1/2	1/4	8	129 1/2	34
Diamond T-LB	3	3/16	1 1/4	1 1/2	16	3 3/4	1/4	8	16	3 3/4	1/4	8	142 1/2	37
Diamond T-R	3	3/16	1 1/4	1 1/2	18 1/2	4	1/4	8	18 1/2	4	1/4	8	154 1/2	37
Diamond T-S	3	3/16	1 1/4	1 1/4	18 1/2	4	1/4	8	18 1/2	4	1/4	8	156 3/8	37
Diamond T-FS&T	3	3/16	1	1 1/4	13 1/4	3 1/2	1/4	8	13 1/4	3 1/2	1/4	8	123 1/4	34
Diehl A	3	1/16	1	1	28	2 1/2	1/16	2	27	2	1/16	2	90	.....
Doane 2½	3	1/4	1 1/4	1/16	34 1/2	3	1/4	2	34	3	1/16	4	126	53
Doane 6	3	.....	1 1/2	1/16	37 1/2	3	1/4	2	46	4	1/16	4	168	64
Dodge	3	3/16	1	1/16	19 1/4	2 1/2	1/16	2	14 3/4	1 3/4	1/16	2	47 3/8	38
Dorris K4	3	1/4	1 1/4	1 1/4	13 1/2	3 1/2	1/4	4	.....	.....	.....	.....	142 1/2	34
Dorris K7	3	1/4	1 1/4	1 1/4	15 3/4	3 3/4	1/4	4	.....	.....	.....	.....	180 7/8	34
Duplex E	3	1/4	1 1/4	1	9 1/2	2 1/2	1/4	2	5 1/2	2 1/2	1/4	2	126	39 3/8
Ellsworth 25A	3	1/16	1 1/4	1 1/4	12	1 1/4	1/4	4	12	1 1/4	1/4	4	Opt	36
Fageol 1½	.....	.....	1 1/16	1 1/2	19 1/4	1 3/4	1/16	2	19 1/4	1 3/4	1/16	2	120	30
Fageol 2½	3	1/4	1 1/16	1 1/16	13 1/4	3 1/2	1/4	2	13 1/4	3 1/4	1/4	2	135	34
Fageol 4500	3	1/4	1 5/8	2	15 1/2	3 3/4	1/16	2	15 1/2	3 3/4	1/16	2	161 1/4	37 3/4
Fageol 5300	3	1/4	1 5/8	2	18	4	1/16	2	18	4	1/16	2	161 1/4	37 3/4
Famous B10	3	1/16	1	1/16	21	2 3/4	1/4	1	48	2	1/16	2	94	34
Famous B12	3	1/16	1	1/16	21	2 1/2	1/4	1	48	2	1/16	2	94	34
Fargo O17	3	1/16	.....	1 1/8	52	3	1/16	2	50 1/2	2	1/16	2	132	33
Fargo P18	3	1/16	.....	1 1/8	52	3	1/16	2	50 1/2	2	1/16	2	132	33
Fargo P19	3	1/16	.....	1 1/8	52	3	1/16	2	50 1/2	2	1/16	2	132	33
Fargo P20	3	1/16	.....	1 1/8	52	3	1/16	2	50 1/2	2	1/16	2	132	33
Federal SD	3	1/16	1	1/16	10 11/32	3	1/4	4	10 11/32	3	1/4	4	112	34
Federal TE	3	1/16	1 1/4	1 1/2	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	120	34
Federal UE	3	1/16	1 1/4	1 1/2	13 1/16	3 1/4	1/4	4	13 1/16	3 1/2	1/4	4	160	34
Federal WD	3	1/16	1 1/4	1 1/2	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	192	38
Federal XC	3	1/16	1 1/4	1 1/2	17 11/16	4	1/4	4	17 11/16	4	1/4	4	192	38
Federal Light Duty	3	1/16	1 1/4	1 1/2	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	88	34
Federal Heavy Duty	3	1/16	1 1/4	1 1/2	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	84	38
Ford T	3	1/16	1 1/8	1/16	23 3/8	1 1/16	11/32	1	12	1 5/8	1/16	2	123 11/32	32
F.W.D. B	3	1/4	1 1/16	1/16	27	3 1/2	1/4	1	43	2 3/4	1/4	2	136	36
Gabriel E	3	1/4	2 1/4	1 3/4	.....	3 1/4	1/4	4	13	3 1/4	1/4	4	144	33
Gabriel F	.....	.....	2 1/2	1 3/4	.....	3 3/4	1/4	4	16	3 3/4	1/4	4	144	37
Garford 25	3	1/16	1	.....	11 3/4	3 1/4	1/4	4	11 3/4	3 1/4	1/4	4	103	34
Garford 70B	3	1/4	1 1/4	.....	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	121	34
Garford 77D	3	1/4	1 1/4	.....	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	144	36
Garford 77C	3	1/4	1 1/4	.....	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	150	32
Garford 68	3	1/4	1 1/4	.....	10 1/2	4	3/8	2	21 5/8	4	1/4	4	150	32
Gary F	3	1/4	1 1/4	3/8	22 1/2	3	1/4	2	22 1/2	3	1/4	2	114	34
Gary GT	3	1/4	1 1/2	3/8	24	3 1/4	1/4	2	24	3 1/4	1/4	2	120	34
Gary J	3	1/4	1 1/2	3/8	27	3 1/2	1/4	2	27	3 1/2	1/4	2	120	34
Gary KT	3	1/4	1 1/2	3/8	32	3 3/4	1/4	2	32	3 3/4	1/4	2	128	36 3/4
Gary M	.....	.....	1 3/4	3/8	36 1/2	4	1/4	2	36 1/2	4	1/4	2	168	39
Gersix K	3	1/4	1 1/4	1 1/2	20	2 1/2	1/4	4	47	2 1/4	1/4	2	131	34
Gersix M	3	1/4	1 1/4	1 1/2	46	2	1/4	2	46	2	1/4	2	114	32
Giant 14	3	1/16	1	.....	19	2	1/16	8	19	2	1/16	8	116 1/2	33
Giant 15	3	1/16	1	.....	19	2	1/16	8	19	2	1/16	8	198	32
Giant 16	3	1/16	1 1/4	.....	45 1/2	2	1/16	4	45 1/2	2	1/16	4	110 1/2	33
Giant 17	3	1/16	1 1/2	.....	56 1/2	2 1/2	1/4	4	46 1/2	2 1/2	1/4	4	183 1/2	36
G.M.C. 16	3	1/16	1	1	43 1/16	1 7/8	1/16	2	43 1/16	1 7/8	1/16	2	.....	.....
G.M.C. 31A	3	1/16	1	1	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	101	33
G.M.C. 31B	3	1/16	1	1	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	125	33
G.M.C. 41A	3	1/16	1	1	13 1/16	3 1/4	1/4	4	13 1/16	3 1/2	1/4	4	126	33
G.M.C. 41B	3	1/16	1	1	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	150	33
G.M.C. 41A	3	1/16	1 1/4	1 1/4	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	144	38
G.M.C. 71B	3	1/16	1 1/4	1 1/4	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	192	38
G.M.C. 101A	3	1/16	1 1/4	1 1/4	17 11/16	4	1/4	4	17 11/16	4	1/4	4	144	38
G.M.C. 101B	3	1/16	1 1/4	1 1/4	17 11/16	4	1/4	4	17 11/16	4	1/4	4	192	38
Gramm-Bernstein 15	3	1/16	1	.....	50	2	.....	1	50	2	.....	1	120	32
Gramm-Bernstein 15-Worm	3	1/16	1	.....	49	1 3/4	.....	1	49	1 3/4	.....	1	120	32
Gramm-Bernstein 20	3	1/16	1 1/4	.....	50	2	.....	1	.....	.....	.....	.....	126	32 1/8
Gramm-Bernstein 25	3	1/4	1 1/4	.....	56 1/2	3 1/2	.....	1	.....	.....	.....	.....	132	36
Gramm-Bernstein 35	3	1/4	1 1/4	.....	66	2 3/4	.....	1	66	2 3/4	.....	1	144	36
Gramm-Bernstein 50	3	1/4	1 1/2	.....	75 1/2	3 3/4	.....	1	75 1/2	2 3/4	.....	1	162	36

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Grant 12	3	1/4	1 1/16	.....	42 1/4	2	1/16	2	41 1/16	2	1/16	2	84	35
Grant 10	3	1/4	1 1/16	.....	45	2 1/2	1/16	2	43 1/16	2 1/4	1/16	2	107	35 1/16
Grant 11	3	1/4	1 1/16	.....	45	2 1/2	1/16	2	43 1/16	2 1/4	1/16	2	134 1/2	35 1/16
Grant 15	3	1/4	1 1/16	.....	54 3/16	2 1/2	1/16	2	52 1/8	2 1/4	1/16	2	107	35 1/8
Grant 16	3	1/4	1 1/16	.....	54 1/16	2 1/2	1/16	2	52 1/8	2 1/4	1/16	2	134 1/4	35 1/8
Hall 2-Worm	.....	.....	.....	.....	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	144	38
Hall 3½-Worm	3	1/16	.....	.....	16	3 3/4	1/4	2	16	3 3/4	1/4	2	180	39
Hall 5-Worm	.....	.....	.....	.....	18 1/2	4	1/4	2	18 1/2	4	1/4	2	144	39
Hall 5-7-Chain	.....	.....	.....	.....	37	2 1/2	1/16	1	59	4	1/4	1	180	39
Harvey WEA	4	1/4	.....	.....	46	2	1/4	2	46	2	1/4	2	120	32
Harvey WFA	4	1/4	.....	.....	52	2 1/4	1/4	2	52	2 1/4	1/4	2	126 1/2	32
Harvey WHA	4	1/4	.....	.....	56	2 1/2	1/4	2	56	2 1/2	1/4	2	144	35
Harvey WKA	4	1/4	.....	.....	69	3	1/4	2	69	3	1/4	2	144	37
Hendrickson I	3	1/4	1 1/4	1/16	12	3 1/2	1/16	4	12	3 1/2	1/16	4	Opt	32 1/2
Hendrickson J	3	1/4	1 1/4	1/16	16	3 3/4	1/16	4	16	3 3/4	1/16	4	Opt	36
Hendrickson K	3	1/4	1 1/2	1/16	18	4	1/16	4	18	4	1/16	4	Opt	38
Highway-Knight A	.....	.....	1 1/2	.....	57	2 1/2	1/4	1	57	2 1/2	1/4	1	150	38
Highway-Knight B	.....	.....	1 1/2	.....	69	3	1/4	1	69	3	1/4	1	150	38
Hood C	3	1/4	1	1/4	23	1	1/16	1	23	2 1/2	1/16	2	30	23
Hoover 15B	3	1/16	1	1 3/4	16	1 3/4	1/16	2	16	1 3/4	1/16	2	82	48
Hoover 20A	3	1/16	1	1 3/4	19	2	1/16	2	19	2	1/16	2	105	54
Huffman B	3	1/16	1	1/16	44	2 1/4	1/8	2	44	1 1/2	1/4	2	123	32
Huffman C	3	1/16	1	1/16	46	2 1/2	1/8	2	44	2 1/4	1/8	2	123	32
Hurlburt 1½	3	.....	1 1/4	1	22	2	1/4	2	22	2	1/4	2	132	35 1/2
Hurlburt 2	3	1/16	1 1/4	1	24	2 1/2	1/4	2	23	2 1/2	1/4	2	144 1/2	34
Hurlburt 3½	3	1/4	1 1/2	1 1/4	26	3	1/4	2	25	3	1/4	2	144 1/2	34
Hurlburt 5	3	1/4	1 1/2	1 1/4	28	3	1/4	2	27	3	1/4	2	144 1/2	34
Independent B, Youngstown, O	3	.....	1	1/16	43	2 1/2	1/4	2	38	1 1/4	1/4	2	108	34
Independent E, Youngstown, O	3	.....	1	1/16	43	2 1/2	1/4	2	38	1 3/4	1/4	2	108	33
Independent F, Youngstown, O	3	.....	1 1/4	1/16	51	3	1/4	2	46	2	1/4	2	110	33 3/4
Indiana 12	3	1/4	1	.....	17 1/2	2	1/16	8	17 1/2	2	1/16	8	108	32
Indiana 20	3	1/4	1 1/4	.....	44	2	1/4	4	44	2	1/4	4	126	33
Indiana 25	3	1/4	1 1/4	.....	51	2 1/4	1/4	4	51	2 1/4	1/4	4	138	33
Indiana 35	3	1/4	1 1/4	.....	56	2 1/4	1/4	4	56	2 1/4	1/4	4	144	34 1/2
Indiana L	3	1/4	1 1/4	.....	68	3	1/4	4	68	2 3/4	1/4	4	156	37 1/2
International H	3	1/16	1.7	1 1/4	43 3/4	2 1/4	1/16	2	43 3/4	2 1/4	1/16	2	67 7/8	34
International F	3	1/16	1.7	1 1/4	43 3/4	2 1/4	1/16	2	43 3/4	2 1/4	1/16	2	88 3/4	34
International K	3	1/16	1.7	1 1/4	50 5/8	2 1/4	1/16	2	50 5/8	2 1/4	1/16	2	92 11/16	34
International G	4	1/4	1.7	1 1/4	50 5/8	2 1/4	1/16	2	50 5/8	2 1/4	1/16	2	99 3/8	34
International L	4	1/4	1.7	1 1/4	74 11/16	2 1/2	1/16	2	74 11/16	2 1/2	1/16	2	169	34
Jones 31A	3	1/16	1	1/16	41 11/16	2 1/2	1/4	2	39 1/4	1 3/4	1/4	2	100 1/2	36
Jumbo O	3	1/4	1 1/4	.....	51 1/4	3	1/16	1	48 3/4	2 1/2	1/16	1	116	34
Jumbo E	3	1/4	1 1/4	.....	51 1/4	3	1/16	1	48 3/4	2 1/2	1/16	1	159	34
Jumbo C	3	1/4	1 1/4	.....	51 1/4	3	1/16	1	48 3/4	2 1/2	1/16	1	72	34
Kalamazoo G	3	1/4	1 1/16	.....	50	2 1/2	1/16	1	.....	2 1/2	1/16	1	126	32 1/2
Kalamazoo H	3	1/4	2 1/16	.....	90	2 1/2	1/16	1	48	2 1/2	1/16	1	148	33
Kalamazoo K	3	1/4	2 1/16	.....	60	2 1/2	1/16	1	60	2 1/2	1/16	1	151	36
Kankankee E	3	1/4	1 1/16	1 1/4	51	3	1/16	2	50	2	1/16	2	148	32
Keldon 19	4	1/16	1 1/4	1 1/4	48	3	1/16	1	45	3	1/16	1	132	34
Kelly-Springfield K31	3	1/4	1	1/16	16 3/4	1 7/8	1/16	4	16 3/4	1 7/8	1/16	4	141	34
Kelly-Springfield K32	3	1/4	1	1/16	17 3/8	1 7/8	1/16	4	17 3/8	1 7/8	1/16	4	141	34
Kelly-Springfield K35	3	1/4	1	1/16	16 3/4	1 7/8	1/16	4	16 3/4	1 7/8	1/16	4	141	34
Kelly-Springfield K36	3	1/4	1	1/16	17 3/8	1 7/8	1/16	4	17 3/8	1 7/8	1/16	4	141	34
Kelly-Springfield K40	3	1/4	1 1/2	1/16	21	2 7/8	1/16	4	21	2 5/8	1/16	4	145	38
Kelly-Springfield K45	3	1/4	1 1/2	1/16	21	2 7/8	1/16	4	21	2 5/8	1/16	4	145	38
Kelly-Springfield K50	3	1/4	1 1/2	1/16	21	2 7/8	1/16	4	21	2 5/8	1/16	4	145	38
Kelly-Springfield K60	3	1/4	1 1/2	1/16	21	2 7/8	1/16	4	21	2 5/8	1/16	4	145	38
King-Zeitler 1½	3	1/16	1	1 1/4	48	3 1/4	1/4	4	48	3 1/4	1/4	4	Opt	32
King-Zeitler 2	3	1/16	1	1 1/4	54	3 1/2	1/4	4	54	3 1/2	1/4	4	Opt	32
King-Zeitler 3½	3	1/16	1	1 1/4	63	2 3/4	1/4	2	63	3 3/4	1/4	4	Opt	36
Kissel-Utility	3	1/16	.....	1 1/4	19	2	1/16	2	19	2	1/16	2	120	34
Kissel-Freighter	3	1/16	.....	1 1/4	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	144	34
Kissel-Heavy-Duty	3	1/16	.....	1 1/4	56	2 1/2	1/16	2	56	2 1/2	1/16	2	156	36
Kissel-Goliath	3	1/16	.....	1 1/4	56	2 1/2	1/16	2	56	2 1/2	1/16	2	168	36
Kissel-Delivery	3	1/16	.....	1 1/4	44 1/4	2	1/16	2	44 1/4	2	1/16	2	96	33 1/2
Kleiber 1	.....	.....	1 1/4	1 1/4	.....	.....	.....	.....	.....	.....	.....	.....	120	34
Kleiber 1½	.....	.....	1 1/4	1 1/4	.....	.....	.....	.....	.....	.....	.....	.....	132	34

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Kleiber 2			1¼	1¾									144	34
Kleiber 2½			1¼	1¾									150	34
Kleiber 3½			1¼	1¾									156	34
Kleiber 5			1½	1¾									168	38
Knox 35	4	¼	1½			4		2	57¾	6½	¼	1	27 1/16	28
Knox 36	4	¼	1¼			4		3	57¾	6½	¼	1	96 7/8	28
Koehler M	4	¼	1¼	1/16	13½	3½	¼	4	13½	3½	¼	2	144	34
Koehler C	3	1/16	1	¼	47	2¼	¼	2	46	2¼	¼	4	108	34
Lange	3				30	2	¼	2	18	3	¼	4	114	**37**
Larrabee-Deyo U	3	1/16	1¼		48	2	¼	2	48	2	¼	2	108	34
Larrabee-Deyo A & B	3	1/16	1¼		60	2½	¼	2	60	2½	¼	2	132	36
Larrabee-Deyo C & D	3	1/16	1¼		54	2¼	¼	2	54	2¼	¼	2	132	36
Larrabee-Deyo T	3	1/16	1¼		72	3	¼	2	72	3	¼	2	162	36
Lombard													120	32
Luedinghaus					40	2¼	¼	2	40	1½	¼	2	120	34
Luverne BBL	3	1/16	1¼	1 11/16		2½	¼	2		2½	¼	2	108	34
Maccar L	3	1/16	1¼	1¼	48	3¼	¼	4	48	3½	¼	4	128¼	34
Maccar H	3	1/16	1¼	5/16	52	3½	¼	4	52	3½	¼	4	143¾	34
Maccar M	3	1/16	1¼	5/16	64	3¾	¼	4	64	3¾	¼	4	157¾	34
Maccar G	3	¼	1½	5/16	72	4	¼	4	72	4	¼	4	166 5/8	37½
Mack AB	3		1¼	¼	14¼	4	¼	4	16½	2½	¼	4	120	33¼
Mack AB-Worm			1¼	¼	13½	3½	¼	4	13½	3½	¼	4	144	33¼
Mack AB-2 Ton	3		1¼	¼	14¼	4	¼	4	16½	2½	¼	4	120	33¼
Mack AB-Tractor	3		1¼	¼	14¼	4	¼	4	16½	2½	¼	4	77	33¼
Mack AC	2		1¼	¼	16 1/16	3	¼	4	20½	3½	¼	4	132	37½
Mack AC 7-Ton	2		1½	¼	16 1/8	3	¼	4	20½	3½	¼	4	87	37½
Mack AC 5½-Ton			1½	¼	16 1/8	3	¼	4	20½	3½	¼	4	156	37½
Mack AC 7½-Ton			1½	¼	16 1/8	3	¼	4	20½	3½	¼	4	87	37½
Mack AC 11-Ton	2		1½	¼	74½	2½	⅛	1	74½	2¼	¼	1	120	34
Mack AC 15-Ton	2		1½	2	12	3¼	¼	2	12	3¼	¼	2	120	34
Master JI	3	1/16	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	120	34
Master JW	3	1/16	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	159	34
Master M	3	¼	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	120	34
Master O	3	¼	1¼	2	13¼	3½	¼	2	13¼	3½	¼	2	120	34
Master W	3	¼	1¼	2	13¼	3½	¼	2	13¼	3½	¼	2	159	34
Master WL	3	¼	1¼	2	74½	2½	⅛	1	74½	2¼	¼	1	74¾	34
Master T	3	¼	1¼	2	16	3¾	¼	2	16	3¾	¼	2	150	36¾
Master A	4	¼	1½	1¾	16	3¾	¼	2	16	3¾	¼	2	186	36¾
Master AL	4	¼	1½	1¾	18	4	¼	2	18	4	¼	2	168	39
Master B	4	¼	1½	1¾	18	4	¼	2	18	4	¼	2	192	39
Master BL	4	¼	1½	1¾	16	1¾	⅛	2	16	1¾	¼	2	102	36 1/16
Maxwell 1½	3	¼	1	1	12	3¼	¼	8						32
Menominee HT	3	1/16	1	1½	13½	3½	¼	8						32
Menominee H	3	1/16	1¼	1¾	13½	3½	¼	8						32
Menominee D	3	1/16	1¼	1¾	16	3½	¼	8						36
Menominee G	3	¼	1½	2	18½	4	¼	8						38
Menominee J	3	¼	1½	2	12	3½	¼	4	12	3½	¼	4	132	34
Moreland 19B	3	1/16	1¼	1¾	13½	3½	¼	4	13½	3½	¼	4	156	34
Moreland 19C	3	1/16	1½	1¾	16	3¾	¼	4	16	3¾	¼	4	168	38
Moreland 19G	3	¼	1½	1¾	18	4	¼	4	18	4	¼	4	168	38
Moreland 19J	3	¼	1½	2	54	2½	1/16	2	44	2	¼	2	102	34
Muskegon 20	3	1/16	1¼	1½	44	2	2¼	2	44	2	2¼	2	102	34
Myers 60	3	1/16	1½	1½	44	2	1/16	2	44	2	2¼	2	112	34
Myers 80	3	1/16	1½	1½	49	2	1/16	1	30	2½	1/16	1	102	35
Napoleon 9	3	¼	1	1/16	49 1/8	2	1/16	2	30	2½	1/16	1	102	35
Napoleon 11	3	¼	1	1/16	50 5/8	3	1/16	2	20 1/16	2½	1/16	1	104½	30½
Nash 2018	4	¼	1¼	1¼	49¼	2½	1/16	2	20 1/16	2½	1/16	1	118¼	31 5/8
Nash 3018	4	¼	1¼	1¼	12	3¼	¼	4	25 1/16	2½	1/16	1	117 1/8	38 7/8
Nash 4017	3	¼	1¼	1¼	12	3¼	¼	2	12	3¼	¼	2	Opt	
Nelson & LeMoon F1	3	1/16	1¼	1/16	12	3¼	¼	2	12	3¼	¼	2	Opt	
Nelson & LeMoon F1½	3	1/16	1¼	1/16	12	3¼	¼	2	12	3¼	¼	2	Opt	
Nelson & LeMoon F2	3	1/16	1¼	1/16	12	3¼	¼	2	12	3¼	¼	2	Opt	
Nelson & LeMoon F3½	3	1/16	1¼	1/16	16½	3¾	¼	2	16½	3¾	¼	2	Opt	
Nelson & LeMoon F5	4	¼	1½	1/16	18	4	¼	2	18	4	¼	2	Opt	
Netco D	3	1/16	1¼		13	3½	¼	2	13	3½	¼	4	116	34
Netco H	3	1/16	1½		13	3½	¼	2	13	3½	¼	4	144	34
Northway B2			1¼	1¾	50½	2¼	¼	2	50½	2¼	¼	4	118	33
Northway B3			1 1/16	1¾	54	2½	¼	2	54	2½	¼	4	148	34 5/8
O. K	3	1/16	1¼		43	2½	¼	1	58	2½	¼	2	125	35
O. K	3	1/16	1¼		43	2½	3/4	1	58	2½	1/16	1	125	35

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Old Hickory M	3	1/16	1	1	46	2	1/16	1	43	2	1/16	1	90	30
Old Hickory W	3	1/16	1 3/8	1	24	2¼	¼	2	24	2¼	¼	2	120	36
Old Reliable A	3	1/16	1	1	48	2	¼	1	54	2	¼	1	105	32
Old Reliable B	3	¼	1¼	1¼	54	2	¼	1	54	2	¼	1	144 5/8	32
Old Reliable C	3	¼	1½	1½	60	2½	¼	1	60	2½	¼	1	150 5/8	32
Old Reliable D	3	¼	1½	1½	72	2½	¼	1	72	2½	¼	1	156 5/8	34
Old Reliable K, L, M	3	¼	1½	1½	54	3½	¼	1	60	4	¼	1	107	36
Oldsmobile T	3		1	1/16	42¼	2	¼	1	41 1/16	2	1/16	1	92 5/8	34
Oneida A	3	1/16			12	3¼	¼	4					130	32
Oneida B	3	¼			12½	3½	¼	4					130	32
Oneida C	3	1/16			12½	3½	¼	4					146	32
Oneida D	3	1/16			15 5/8	3¾	¼	4					162	36
Oneida E	3	1/16			18	4	¼	4					204	38
Oshkosh A	3	1/16	1¼	2	23 5/8	3	¼	2	43 1/16	2½	1/16	2	108 5/8	34
Oshkosh AA	3	1/16	1¼	2	23 5/8	3	¼	2	43 1/16	2½	1/16	2	143 5/8	34
Packard 1½E	3	1/16	1 5/8	1¾	7 11/16	4¾	¼	2	14	2	1/16	2	126	31¾
Packard 2E	3	¼	1 5/8	1¾	7 11/16	4¾	¼	2	14	2	1/16	2	132	31¾
Packard 3E	3	¼	1 5/8	1¾	9 1/16	4¾	¼	2	17	3	1/16	2	144	39
Packard 4E	3	¼	1 5/8	1¾	9 1/16	4¾	¼	2	18¾	3	1/16	2	144	39
Packard 5E	3	¼	1 5/8	1¾	9 1/16	6½	¼	2	18¾	3½	1/16	2	144	39
Packard 6E	3	¼	1 5/8	1¾	9 1/16	6½	¼	2	18¾	3½	1/16	2	144	39
Paige 50-18	3	¼	1 5/8	1¾	9 1/16	6½	¼	2	18¾	3½	1/16	2	144	39
Paige 51-18	3	¼			13¼	3½	¼	4	13¼	3½	¼	4	126	33
Parker F9	3	¼			13¼	3¾	¼	4	13¼	3¾	¼	4	144	35
Parker J9	3	¼	1¼		10¾	5	¼	2	17	3¾	¼	4	127	33
Parker M9	3	¼	1½		10¾	5	¼	2	17½	3½	¼	4	139½	33
Patriot Lincoln	3	¼	1½		10¾	5	¼	2	18	4	¼	4	145	37
Patriot Washington	3	1/16	1	1/16	41½	2½	¼	2	40	1¾	¼	8	109	34
Pierce-Arrow 5	3	1/16	1¼	1¾	20	2½	¼	4	48	2¼	¼	4	151¾	34
Pierce-Arrow 2	4	1/16	1½	1¾	7¼	3½	¼	2	18	4	¼	4	102½	38 1/16
Pittsburgher 2½	4	¼	1 3/8	1¾	8 1/16	5	¼	2	18 13/16	3	¼	4	98¼	34 1/8
Pony ¼	3	¼	1¼	1¼	44	2¼	¼	2	44	2¼	¼	4	136	33
Rainier R6	3	1/16	1/8	⅛					10	1½	⅛	2	40	24
Rainier R9	3	1/16	1 1/16	1/16	19	2	1/16	2	19	2	1/16	2	96⅛	34
Rainier R11	3	1/16	1 1/16	1/16	44½	2	¼	2	44½	2	¼	2	124	34
Reliance 10	3	1/16	1¼	1/16	11¼	3	¼	2	11¼	3	¼	2	87¾	34
Reliance 20	3	¼	1¼	1/8	15	2	1/16	4	15	2	1/16	4	122	32
Reo F	3	¼	1¼	5/16	15	2	1/16	4	15	2	1/16	4	127	32
Republic 10	3	1/16	1	1	43	2¼	1/16	4	38 1/16	2	1/16	4	84	30
Republic 11X	3	1/16	1		45	2½	1/16	2	43	2¼	1/16	2	98½	34
Republic 19	3	1/16	1¼		54¾	2¼	1/16	2	52½	2¼	1/16	2	118½	34
Republic 20	3	¼	1¼		54¾	2¼	1/16	2	52½	2¼	1/16	2	120¾	34
Riker B	3	¼	1¼		56½	3½	1/16	2	31	4½	1/16	2	146	37
Riker BB	5	¼			7¼	4½	1/16	2	20	4	1/16	4	150	38
Rock Falls 1919	5	¼			7¼	4½	1/16	2	20	4	1/16	4	150	38
Rock Falls 1920	3	1/16	1½		43	2	1/16	2	40½	2	1/16	2	87	33
Rowe CW						2	1/16	2					87	33
Rowe CDW2	4	¼	1	1/16	19	2	1/16	8	19	2	1/16	8	121½	33
Rowe CDW2½	4	¼	1¼	1/16	45	2	1/16	4	45	2	1/16	4	123	33
Rowe DEW3½	4	¼	1¼	1/16	51½	2½	¼	4	51½	2½	¼	4	147	33
Rowe FW5	4	¼	1½	1/16	56½	2½	¼	4	56½	2½	¼	4	150	36
Rowe GW3	3	¼	1¼	1/16	68	3	1/16	4	68	3	1/16	4	156	38½
Sandow G	3	¼	1	1/16									144	33
Sandow CG	3	¼	1	1/16	20	2	1/16	2	20	2	1/16	2	96	34
Sandow I	3	¼	1	1/16	20	2	1/16	2	20	2	1/16	2	120	34
Sandow J	3	¼	1	1/16	60	3	1/16	1	60	3	1/16	1	132	32
Sandow L	3	¼	1¼	1/16	13½	3½	¼	2	16	3½	¼	2	144	37
Sanford 25	3	¼	1¼	1/16	18½	4	¼	2	18½	4	¼	2	144	37
Sanford 35	3	¼	1¼	1¼	51½	2¼	¼	1	51½	2½	¼	1	144	35
Sanford 50	3	¼	1¼	1¼	56	2½	¼	1	56	2½	¼	1	145	35
Schacht 2	3	¼	1¼	1¼	69	3	¼	1	69	3	¼	1	145	35
Schacht 2½	3	¼	1¼		8	3	¼	2	13½	3	¼	4	116	35¼
Schacht 3½	3	¼	1¼		8	3	¼	2	13½	3	¼	4	140	35¼
Schacht 5	3	¼	1¼		8	3	¼	4	13½	3	¼	4	152	35¼
Selden 1½A	3	¼	1¼		8	3	¼	4	15	4	¼	4	152	35¼
Selden JWBL	3	1/16	1	1 1/16	11 11/16	3¼	¼	2	11 11/16	3¼	3/8	4	114	34
Selden 3½A	3	1/16	1	1 1/16	13 3/8	3½	¼	2	13 3/8	3½	¼	2	144	34
Selden DL	3	1/16	1¼	1 1/16	15¾	3¾	¼	2	15¾	3¾	¼	2	195	37½
Service 220	3	1/16	1 1/16	1 1/16	4		1/16	2	4	3¾	1/16	2	168	36
Service 31	3	¼	1 11/16	1 11/16	12	3¼	¼	2	12	3¼	¼	2	109½	34
					13½	3½	¼	2	13½	3½	¼	2	121 1/16	34

Replacement Table—Continued

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per Cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Service 36	3	1/4	1 11/16	1 11/16	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	121 1/16	34
Service 51	3	1/4	1 11/16	1 11/16	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	131 1/8	34
Service 71	3	1/4	1 11/16	1 11/16	16	3 3/4	1/4	2	16	3 3/4	1/4	2	150 1/4	38
Service 76	3	1/4	1 11/16	1 11/16	16	3 3/4	1/4	2	16	3 3/4	1/4	2	145 3/4	38
Service 101	3	1/4	1 11/16	1 11/16	18 1/2	4	1/4	2	18 1/2	4	1/4	2	145 3/4	38
Signal F	3	1/16	1 7/16	1 11/16	12	3 1/4	1/4	2	12	3 1/4	1/4	2	211	34
Signal H	3	1/16	1 7/16	1 11/16	12	3 1/4	1/4	2	12	3 1/4	1/4	2	211	34
Signal J	3	1/16	1 7/16	1 11/16	13 1/2	3 1/2	1/4	2	13 1/2	3 1/2	1/4	2	220	34
Signal M	3	1/16	1 7/16	1 11/16	16	3 1/2	1/4	2	16	3 1/2	1/4	2	268	38
Signal R	3	1/4	1 5/8	1 7/8	18	4	1/4	2	18	4	1/4	2	280	38
Stoughton B													124	
Stoughton D													124	
Stoughton E													136	
Standard 56	3	1/16	1	1/16	10 7/8	3	1/4	4	10 7/8	3	1/4	4	120	32
Standard 76	3	1/16	1 1/8	1/16	13 1/16	3 1/2	1/4	4	13 1/16	3 1/2	1/4	4	122 1/2	32
Standard 66S	3	1/16	1 1/4	1/16	15 5/8	3 3/4	1/4	4	15 5/8	3 3/4	1/4	4	120	38
Standard 86	3	1/16	1 1/4	1/16	17 11/16	4	1/4	4	17 11/16	4	1/4	4	120	38
Sterling 1½	3	1/4	1 1/4	1/4	11 5/8	3 1/4	1/4	8	11 5/8	3 1/4	1/4	8	120	33 1/2
Sterling 2½	3	1/4	1 1/4	1/4	13 7/8	3 1/2	1/4	8	13 7/8	3 1/2	1/4	8	138	34
Sterling 3½	3	1/4	1 1/4	1/4	15 1/2	3 3/4	1/4	8	15 1/2	3 3/4	1/4	8	144	38
Sterling 5-Worm	3	1/4	1 1/4	1/4	18	4	1/4	8	18	4	1/4	8	158	38
Sterling 5-Chain	3	1/4	1 1/4	1/4	56 1/2	3 1/2	1/4	2	28 3/4	4	1/4	1	158	38
Sterling 7½	3	1/4	1 1/4	1/4	56 1/2	3 1/2	1/4	2	28 3/4	4	1/4	1	158	38
Stewart M7	3	1/16	.....	1 1/4	50 5/8	2	1/16	2	8	5	1/16	2	150 1/2	32
Stewart M8	3	1/16	.....	1	41 3/8	2	1/16	2	22 3/4	2	1/16	1	99 1/2	32
Stewart M9	3	1/16	.....	1	48 1/2	2	1/16	2	8	5	1/16	2	119	32
Stewart M10	3	1/16	.....	1 1/4	60	3	1/16	2	8	5	1/16	2	163 3/4	32
Stewart M11	3	1/16	.....	1/8	41 3/8	2	1/16	2	22 3/4	2	1/16	1	95	32
Sullivan E	3	1/4	1 3/16	1 11/16	13	3 1/2	1/4	8	13	3 1/2	1/4	8	106	33 1/2
Sullivan F	3	1/16	1 11/16	1 11/16	13	3 1/2	1/4	8	13	3 1/2	1/4	8	146	34
Texan TK39	3	1/16	1	1 1/4	17 1/2	2 1/4	1/16	4	17 1/2	1 1/2	1/16	4	100	36
Tiffin GW	3	1/16	1 1/4	1 1/4	46	2	1/4	1	46	2	1/4	1	117	35
Tiffin MW	3	1/16	1 1/4	1 1/4	52	2 1/4	1/4	1	52	2 1/4	1/4	1	138	32 3/4
Tiffin PW	3	1/16	1 1/4	1 1/4	58	2 1/2	1/4	1	58	2 1/2	1/4	1	151	35 1/2
Tiffin TW	3	1/16	1 1/4	1 1/4	58	3	1/4	1	58	2 1/2	1/4	1	156	38 1/2
Tiffin UW	3	1/16	1 1/4	1 1/4	58	3	1/4	1	58	2 1/2	1/4	1	156	38 1/2
Titan 3½	3	1/4											144	
Titan 5	3	1/4											144	
Titan 2½	3	1/4											144	
Tower J	3	1/16	1 1/4	1 1/4									138	32 1/2
Tower H			1 1/4	1 1/4									150	32 1/2
Tower G	3	1/4	1 1/2	1 1/2									156	37
Traffic C	3	1/16	1	1/16	42 1/2	2 1/2	1/16	2	39 1/2	1 3/4	1/16	2	120 3/4	42
Transport 20	3	1/16	.....	.....	46 1/2	2	1/16	2	47	1 1/2	1/16	2	101	34
Transport 30	3	1/16	.....	.....	46 1/2	2	1/16	2	47	1 1/2	1/16	2	116 5/8	34
Transport 50	3	1/16	.....	.....	50	3	1/16	2	48 1/2	2 1/2	1/16	2	123	34
Triangle AA	3	.....	1	1	23 1/8	2 1/2	1/16	1	41	2	1/16	1	94	34
Triangle A	3	.....	1	1	3 1/4	4	1/16	2	49	2	1/16	1	126	35
Triangle B	3	.....	1 1/4	1 1/4	3 1/4	4	1/16	2	52	2	1/16	1	132	35
Triangle C	3	.....	1	1	3 1/4	4	1/16	2	52	2	1/16	1	128 3/8	35
Triumph 1½													120	
Twin City A & B	3	.....	2	2	16	3 1/2	1/4	2	48	3 1/2	1/4	2	138	46
Union F	3	1/4	1 1/4	1	55	3	1/16	1	50	2	1/16	1	144	32
Union H	3	1/4	1 1/4	1	19	3 1/2	1/16	2	10	4	1/16	2	168	34
U.S.N	3	1/16	1	1/8	50 1/2	2	1/16	2	46 1/2	1 1/2	1/16	2	120	34
U.S.H	4	1/16	1 1/4	1/4	46	2 1/4	1/4	2	46	2 1/4	1/4	2	132	36
U.S.J	3	1/16	1 1/2	1/4	50	2 1/2	1/4	2	50	2 1/2	1/4	2	156	39
U.S.K	...	1/4	1 1/2	1/4	62	3	1/4	2	62	3	1/4	2	168	39

Name, Model and Tonnage	ENGINE				BRAKE LINING								FRAME	
	Piston Rings		Carburetor		Service				Emergency				Length	Width
	No. per cyl.	Diameter	Outlet Diameter	Inlet Diameter	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Velie 46	3	1/16	1	1/16	54 1/16	2 1/2	1/16	2	52 1/16	2 1/4	1/16	2	120	31
Velie 25B	3	1/16	1 1/4	1/16	12	3 1/4	1/4	4	12	3 1/4	1/4	4	134 1/2	33
Velie 26B	3	1/16	1 1/4	1/16	15 5/8	3 3/4	1/16	4	15 5/8	3 3/4	1/16	4	154 1/2	37
Vim 27	3	1/16	7/8	.....	14 1/2	1 1/2	1/16	4	14 1/2	1 1/2	1/16	4	64	30
Vim 28	3	1/16	7/8	.....	14 1/2	1 1/2	1/16	4	14 1/2	1 1/2	1/16	4	83 1/2	30
Vim 25	4	1/16	1	.....	19	2	1/16	4	19	2	1/16	4	92	32
Vim 22	4	1/16	1	.....	44 1/2	2	1/4	2	44 1/2	2	1/4	2	121 1/4	34
Vim 23	5	1/16	1 1/4	.....	51 1/2	2 1/4	1/4	2	55 1/2	2 1/4	1/4	2	159 1/2	34
Walker M					43	2 1/4	1/16	2	18	1 3/4	1/16	4	87	32
Walker K					46	2 1/2	1/16	2	18	2	1/16	4	96	32
Walker L					53 1/2	2 1/2	1/16	2	22 1/2	2	1/16	4	120	35
Walker P					53 1/2	3	1/16	2	22 1/2	2 1/2	1/16	4	140	35
Walker N					53 1/2	3	1/8	2	22 1/2	2 1/2	1/16	4	162	35
Walter S	3	1/4	1 3/4	.....	15	5	1/4	4	57	2 1/2	1/4	2	150	36
Walter T			1 1/2	.....	14	4	1/4	4	50	2 1/2	1/4	2	144	33
Ward LaFrance 2A	3	1/16	1 3/8	1 1/4	13	3 1/2	1/4	4	13	3 1/2	1/4	4	.....	33
Ward LaFrance 3½A	3	1/16	1 3/8	1 1/2	26	2 1/2	1/4	4	18	3 1/2	1/4	4	.....	33
Ward WS					29	1 1/2	1/16	2	15 3/4	1 1/2	1/16	1	72	37 1/2
Ward WA					16	1 3/4	1/16	8	16	1 3/4	1/16	8	95	33 1/16
Ward WB					20	2	1/16	8	20	2	1/16	8	120	33 3/4
Ward WD					48 7/8	2 1/4	1/4	4	48 7/8	2 1/4	1/4	4	144	33 7/8
Ward WF					56 7/8	2 1/2	1/4	4	56 7/8	2 1/2	1/4	4	168	34 5/8
Ward WH					68 3/4	3	1/4	4	68 3/4	3	1/4	4	192	37
Ware 3½ & 1½			2 1/2	1 1/2	.....	3	1/4	...	42	3	1/4	...	120	36
White 15	3	.....	1 1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	76 1/2	34
White 20	3	.....	1 1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	107 1/2	34
White 40			1 1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....	157	42
White 45			1 1/2	.....	.....	.....	.....	.....	.....	.....	.....	.....	157	42
White Hickory H	3	1/16	1 1/4	1 1/2	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	116 1/4	32
Wichita L	3	1/16	1	1 3/8	19	2	1/16	2	19	2	1/16	2	Opt	30
Wichita M	3	1/4	1	1 3/8	45	2	1/4	2	45	2	1/4	2	Opt	30
Wichita R	3	1/4	1	1 3/8	51	2 1/4	1/4	2	51	2 1/4	1/4	2	Opt	30
Wichita O	3	1/4	1 1/4	1 3/4	56	2 1/2	1/4	2	56	2 1/2	1/4	2	Opt	36
Wichita S	3	1/4	1 1/2	2	60	3	1/4	2	60	3	1/4	2	Opt	36
Wilcox A	3	1/4	.....	.....	24 1/8	2 1/2	1/16	4	16	2 1/2	1/16	4	96	34
Wilcox B	3	1/4	.....	.....	24 1/8	2 1/2	1/16	4	16	2 1/2	1/16	4	132	33
Wilcox C			.....	.....	27 1/2	2 1/2	1/16	4	20	2 1/2	1/16	4	141	33
Wilcox D			.....	.....	56 1/2	2 1/2	1/4	2	56 1/2	2 1/2	1/4	2	153	33
Wilcox W	3	1/4	.....	.....	68 1/2	3	1/4	2	68 1/2	3	1/4	2	153	38
Wilson 1	3	1/16	.....	.....	39 1/2	1 3/4	1/16	1	39 1/2	1 3/4	1/16	1	89 1/2	34
Wilson 2	3	1/16	.....	.....	13 1/4	3 1/2	1/16	4	13 1/4	3 1/2	1/16	4	126	33
Wilson 3½	3	1/16	.....	.....	16	3 3/4	1/16	4	16	3 3/4	1/16	4	147	38
Wilson 5	3	1/16	.....	.....	18	4	1/16	4	18	4	1/16	4	147	38 1/4
Winther 39	3	1/4	1 1/4	.....	50	2 1/4	1/4	2	22 1/2	2 1/4	1/4	1	120	30
Winther 430	3	1/4	1 1/4	.....	50	2 1/4	1/4	2	22 1/2	2 1/4	1/4	1	120	30
Winther 49	3	1/4	1 1/4	.....	52	3	1/4	2	50	2 1/4	1/4	2	144	33
Winther 450	3	1/4	1 1/4	.....	52	3	1/4	2	22 1/2	2 1/4	1/4	1	144	30
Winther 69	3	1/4	1 1/4	.....	62	3	1/4	2	60	2 1/2	1/4	2	156	33
Winther 479	3	1/4	1 1/4	.....	62	3	1/4	2	60	2 1/2	1/4	2	156	33
Winther 979	3	1/4	1 1/4	.....	52	3	1/4	2	50	2 1/4	1/4	2	168	33
Winther 89	3	1/4	1 1/4	.....	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Winther 109	3	1/4	1 1/2	.....	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Winther 129	3	1/4	1 1/2	.....	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Winther 149	3	1/4	1 1/2	.....	93	2 1/4	1/4	2	93	2 1/4	1/4	2	156	33
Witt Will 1½	3	1/16	.....	1 1/4	46	3 1/4	1/4	4	46	3 1/4	1/4	4	102	32
Witt Will 2½	3	1/16	.....	1 1/4	48	3 1/2	1/4	4	48	3 1/2	1/4	4	122	32
Wolverine C	...	.....	1	1	41 1/2	2 1/2	1/16	2	41 1/2	1 3/4	1/16	2	120	34 1/2

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